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DECEMBER, 1904. VOL. XXIV. No. 6.

The Geographical Journal

INCLUDING THE PROCEEDINGS OF THE ROYAL GEOGRAPHICAL SOCIETY.

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The Geographical Journal.

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FOR ANTARCTIC DISCOVERY
CAPTAIN ROBERT FALCON SCOTT R.N. M.V.O. F.R.G.S.
JANUARY 2 1902
MARCH 3 1904
COMMANDER OF THE EXPEDITION

Special Antarctic Medal presented by the Royal Geographical Society to Captain R. F. Scott, C.V.O., R.N., in Gold, and to the Officers and Men of the "Discovery" in Silver, November, 1904.

The
Geographical Journal.

No. 6. DECEMBER, 1904. Vol. XXIV.

THE ANTARCTIC MEETING AT THE ALBERT HALL.

Presentation of Medals to Captain Scott.

On Monday, November 7, a large and distinguished assembly gathered in the Albert Hall to welcome Captain Scott on his return from the Antarctic Regions, and hear from him the account of the brilliant exploits performed by himself and his comrades during their long sojourn in those regions. The chair was taken by Sir Clements Markham, who was supported, among others, by the American Ambassador. The platform was occupied by the Council of the Society and many distinguished travellers and explorers, as well as by the officers and crew of the *Discovery* and the officers of the *Morning*. The audience, which numbered some seven thousand, included a large number of Fellows of the Society and their friends, with other visitors. Captain Scott's narrative was listened to with close attention and keen interest, and the applause with which it was punctuated showed the appreciation by the hearers of the determination and daring shown by the gallant explorers in their fight with the adverse conditions of the Far South. Many were the hairbreadth escapes of which Captain Scott had to tell, the most thrilling incident being no doubt that which occurred during the leader's return from his sledge expedition over the great inland ice-plateau of Victoria Land, when, with one of his two companions, he fell into an unnoticed crevasse in the glacier, and was only saved by the tackle attaching him to the sledge which the third member of the party just managed to hold back from following them into the yawning ice-chasm. The address was illustrated throughout by a remarkable series of lantern-slides, about 150 in all, which gave a vivid idea of the wild and desolate character of the icy southern regions, and of the animal life by which alone the desolation is relieved.

They also helped the audience to realize the conditions of life to which the explorer is subject who attempts to unveil the mysteries of this, the last *terra incognita* on the Earth's surface.

It is unnecessary here to publish in full the substance of Captain Scott's address, as the main outlines have already been put before the readers of the *Journal* in the reports printed in the numbers for July, 1903, and July, 1904, the latter being illustrated by a map, of which copies were distributed to the audience. A further outline of the scientific results of the expedition will also, it is hoped, be put before the Society at one of the evening meetings during the present session.

In introducing Captain Scott to the audience, the PRESIDENT said: We are assembled in this vast hall to welcome home Captain Scott and the officers and men of the *Discovery* on their return from their arduous and difficult services. Look at those flags on the right and on the left of the organ—which is now covered by a sheet—those are the sledge-flags with which our countrymen bore the cross of St. George to the utmost corners of the Earth, where foot of man had never trod before. Captain Scott will now tell us the story of that great work, and it is my privilege to introduce to this vast assembly our distinguished explorer.

After the address, which lasted about an hour and a half, and was heard with great clearness to the furthest end of the vast building, the PRESIDENT said: The meeting will, I am sure, desire me to convey its very cordial thanks to Captain Scott for his interesting address. The Council of our Society are deeply impressed by the admirable way in which Captain Scott has conducted the expedition, by the zeal and ability shown by the officers and the scientific staff, and by the splendid work and constant loyalty of the men. We have decided to strike a special Antarctic Medal in gold for Captain Scott, and one in silver for each of the officers and men. It is now my pleasure to present Captain Scott, in the name of the Royal Geographical Society, with our special Antarctic Medal.

I introduce to you His Excellency the American Ambassador, who will also say a few words.

The Hon. JOSEPH CHOATE: The magnificent tribute which the audience paid to Captain Scott to-night, in recognition of the hardships and perils that he has encountered, and the great achievements that he has won, could hardly be complete, I think, without a single word of sympathy from the other side of the Atlantic. It is true that my countrymen are at this moment engaged in a great affair of their own which absorbs the attention of every man, woman, and child in the Republic, but yet they have room in their hearts for a word of greeting to your distinguished explorer. It is true, also, that they have had no hand or part in this great Antarctic Expedition, but for years and generations, nevertheless, they have been interested in polar exploration.

The Government and the people alike have been interested in it, and if you will only let Captain Scott continue his great work and complete the map of the world by planting the Union Jack upon the south pole, and let our Peary proceed with his disciplined followers and plant the Stars and Stripes upon the north pole, why then you will make the two ends of this great world meet, and leave the globe that we inhabit as it properly should be—in the warm and fraternal embrace of the Anglo-Saxon race. I will not take up your time to do more than mention the names of some of our own Arctic explorers, and that for a special purpose. You have all heard of Dr. Kane, and Dr. Hayes, and Lieut. De Long, and Captain Hall, and Greely, and last, but not least, Peary. All of those who survive their perilous undertakings, and return to the bosom of their country, receive cordial recognition from this side of the water, and all, except Captain Hall and Lieut. De Long, who sacrificed their lives in the Arctic Regions, received the medal of the Royal Geographical Society, in recognition of their services to mankind. Now, in recognition of that fact, and the interest of themselves and the Society and of the great people they represent in this advance of knowledge, this progress of mankind, this constant growth of science, which is represented by the work of men like Captain Scott, the Philadelphia Geographical Society has authorized me to present on its behalf to Captain Scott this Gold Medal for the year 1904. It bears on one side the medallion of Dr. Elisha Kent Kane, their old discoverer, in whose honour, I believe, their Society was organized, and on the reverse there is this inscription: "For eminent Geographical Research—Philadelphia Geographical Society—Incorporated, 1903—Awarded to Captain Robert F. Scott in the year 1904," to whom I have the very great privilege of presenting it in their name to-night.

Captain Scott: I hope that you will allow me to reply to the great honour in a very few words. Speaking for myself and my companions, we have had an extraordinary experience in more ways than one. The majority of us are naval officers, and we have been in the habit of serving under naval discipline. On this occasion we have served, not under naval discipline, but with the same laws as if we had been under naval discipline, and we have served two great Societies. I may say sir, that it has been our pleasure to know that our interests and everything to do with them have been looked after in the same way as if we had been serving in His Majesty's fleet. Sir, I know we have to thank you and the Council and officers of the Royal Geographical Society for this. I cannot say how much I appreciate this great award. It seems a great deal more, when I look back on others who have had special medals, it seems a great deal more, certainly than I deserve. Perhaps there is one thing that makes polar exploration a more interesting task than the greater number of those tasks in which you serve your country—

it is that the results do not only interest your own countrymen, but they interest the inhabitants of other countries. A practical example of that has been shown by His Excellency, and it seems as though I am rather overcome by it raining medals to-night. But I am bound to confess that there is no quarter from which such rain could more happily come than from His Excellency.

The PRESIDENT: Captain Scott has described to you the joy he and his companions felt on the arrival of the *Morning*. It was a necessity that the Expedition should be annually visited. We therefore bought the stout old ship the *Morning*, and we gave the command to Captain Colbeck. Captain Colbeck has done his work admirably. He has shown great organizing power, he has shown seaman-like qualities, he has shown ability, and, above all, he has shown firmness. We also desire to thank the officers of his ship who so nobly and so admirably seconded his efforts, and we thank the men of the *Morning* for their excellent conduct, which has done honour to the mercantile marine. For these things the Council of our Society was desirous of showing what it felt on the return of the *Morning* from her two voyages. The Council has therefore resolved to present a testimonial to Captain Colbeck in the form of this piece of plate, which is intended in all its parts to illustrate the voyage and to illustrate the Antarctic Region. The handle represents Scott island, which was discovered by Captain Colbeck. The globe, which is intended for a punch-bowl, represents the voyage, and it is supported by three kinds of Antarctic seals. The following verses are engraved round the handle and round the equator—

"Joy cometh in the Morning."

"We bring you in the Morning bread to the full."

I now have great pleasure in presenting Captain Colbeck with our testimonial.

Captain COLBECK: I really do not know how to thank you for this reception, and you, Sir Clements Markham, for the kind way in which you have shown your appreciation of the work done by the *Morning*. We have all felt it a great honour to be associated with Captain Scott in the *Discovery*, and to work with him, and I am sure what little we did has given us more pleasure than he will ever believe. This has been my first voyage under naval officers, and I am proud to have had this experience. My respect for the navy increased as my knowledge of Captain Scott and his crew increased. Thank you for the confidence you have always shown in us of the *Morning;* it has always assisted us. We always felt we were being supported the whole time. Sir, I thank you.

The proceedings then terminated.

ENGLAND AND WALES VIEWED GEOGRAPHICALLY.*

By HUGH ROBERT MILL, D.Sc.

It is the causal idea in geography which makes the science rich and full of human interest, and the object of the present article is to indicate, in a particular case, the broad lines along which this idea works, and to give such concrete instances as may help the reader to follow them farther and apply them more completely. In treating England and Wales from the purely geographical standpoint, the aim is thus not to state facts which may be new to the reader, but rather to supply a framework in which the familiar facts fit naturally, and by their placing throw light upon each other and the whole.

Geologists have pointed out that the nature and arrangement of the rocks determine the way in which climatic conditions act upon and shape the land into hill and valley or plain. But this is only the beginning of a vast and complicated system of mutually interacting agencies. The land-forms, produced originally by climatic influences, affect in their turn the incidence of wind and rain so as to give rise to local climates of great interest and importance. Climate and land-surface together affect the distribution of vegetation and the nature of plant associations, and this distribution also reacts upon both the climate and the land-surface. All these influences bear upon the distribution of animals, and play their part in deciding the places of human settlement and the lines of human movement, and finally human energy reacts upon every element of the complex geographical environment, and that more effectively than any of the unconscious activities of nature.

The form and elevation of the land-surface are the most important geographical conditions at any particular epoch of time. Although they are constantly changing on account of the action of all the forms of activity which they direct by offering unequal resistance, the process is so slow that, except in a few instances, it is of no importance within the range of human history. Viewed in relation to the vistas of geological time, the hills may be fleeting shadows and the coasts changing forms, but geographically, save for the small exceptions referred to, the hills are eternal and the coasts are boundaries that cannot be passed. The permanence of physical configuration in relation to human history is a fact that should never be lost sight of. It constitutes one of the clearest lines of division separating the fields of geography and geology.

The fundamental conditions of vertical relief and coast-development in England and Wales are shown with beautiful clearness in the map, where they appear alone, on a somewhat small scale it is true, but unobscured by artificial boundary lines or the names of towns or counties.

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* To accompany a map embodying the nomenclature of the physical features of England and Wales. Map, p. 708. This map was prepared by Mr. J. G. Bartholomew,

Strictly speaking, the large island of Great Britain should be described as a single unit, yet it is surprising how distinct the northern and southern portions are, physically as well as historically; and there is no violence done to fact by treating England and Wales by themselves. The coasts are more uniform in outline, less indented, and far less deeply fringed by off-lying islands than those of Scotland; but, as in the northern kingdom, the east coast is simpler and less indented than the west.

From the mouth of the Tweed on the extreme north in lat. 55° 48′ to Lizard Head on the extreme south in 49° 58′, there is a range of nearly six degrees in latitude; and from Lowestoft in long. 1° 56′ E. to Land's End in 5° 43′ W., there is a range of 7½ degrees in longitude, corresponding to a difference of half an hour in time. If the extreme points of the coast were joined by straight lines to form a figure resembling a triangle, but open at the top, the eastern side would measure 348 miles, the southern 316 miles, and the western 354 miles. When, however, allowance is made for the indentations of the actual outline, the east coast is found to measure 640 miles, the south coast 545 miles, and the west coast as much as 1225 miles. If the smallest possible length of coast-line be represented in each case by 1, the actual length of the east coast would appear as 1·8, of the south coast 1·7, and of the west coast no less than 3·5; in other words, the west coast is twice as much indented as the east or south.

The indentations of the coast are sufficiently large and numerous to secure that no point in the whole of England and Wales is more than 75 miles from the sea. The most inland part of the country is a narrow strip stretching from Buckingham to near Birmingham. The narrowness of the southern part of the North Sea and of the eastern end of the English Channel enable the great land mass of the neighbouring continent to influence the climate of a considerable part of the south-east of England, thus extending the area of typically inland country.

The three coasts of England appear even more dissimilar when considered in relation to the land behind them and the sea in front. The unindented east coast borders the Eastern Plain for the whole distance

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and the nomenclature upon it originated in a discussion at a meeting of the Research Department of the Royal Geographical Society upon a paper by Dr. H. R. Mill. A sub-committee of the Research Committee, consisting of Mr. G. G. Chisholm, Mr. H. J. Mackinder, and Dr. H. R. Mill, was appointed to suggest a nomenclature for the larger features of the relief of England and Wales, especially for such features as were without definite names for their whole extent. This Committee proposed a series of names, endeavouring to introduce none which were not in harmony with the general character of English place-names. The proposals were discussed in the Research Committee, and remitted to the Council of the Royal Geographical Society, by which, after further discussion and some modification, they were approved. Although the nomenclature proposed by the Committee and approved by the Society is adopted, the article cannot claim to express more than the individual views of the author.

between the chalk promontories of Flamborough Head and the South Foreland. It is broken by the large and shallow estuaries of the Humber, the Wash, and the Thames. The estuary of the Thames opening opposite the mouths of the Rhine, in a sense made London; but the town has grown to such importance that to the sailor the whole estuary is known as London River, and technically the Port of London includes all the waterways and docks between London Bridge and the Nore. Both the Thames and the Humber early became, and have always continued to be, great centres of maritime trade with the Continent; but the Wash is too shallow for modern ships, and except for Harwich—a ferry-port to the Continent—none of the smaller estuaries or coast towns are more than fishing ports or pleasure resorts. North of Flamborough Head the coast is steeper and higher, the estuaries, though small and narrow, lead into regions of mineral wealth, so that they could be profitably deepened to admit the largest vessels for the export of coal and manufactures of iron and chemicals. Thus the Tees has given rise to the iron-exporting and ship-building ports of Middlesbrough and Hartlepool; the Wear gives access to the great steel-ship building town of Sunderland; and the narrow estuary of the inky Tyne has become one long seaport for sending out coal, chemicals, and ships and munitions of war from Shields at the mouth to Newcastle at the head of navigation.

The North Sea stretches as a shallow and often a very stormy sheet of water towards the Continent. Depths exceeding 30 fathoms do not occur south of the latitude of Flamborough Head, and the deepest water between any part of the east coast of England and the opposite shore of the Continent reaches 50 fathoms only in one small patch. The floor of the North Sea rises in the centre to a large plateau known as the Dogger Bank, on which the depth varies from 20 to less than 10 fathoms. South of the Dogger, the sea-bed is curiously ridged and furrowed by long banks and "pits" running nearly parallel to the coast, each of which has been discovered and sounded out by the fishermen who have from time immemorial reaped the ever-ripe harvest of the flat-fish of the North Sea. The soles and plaice bred in the shallow water of the Eastern Grounds bordering the continental shore migrate as they approach maturity towards the central and western banks, so that large-sized fish were probably always more numerous off the coast of England than near the Dutch and German ports. In their time one or another of the pits or banks became famous for the abundance or the quality of its fish, and in the days of line-fishing and of trawling smacks, the fishing villages adjacent to these grounds became places of local importance. The introduction of steam trawlers and of steam fish-carriers changed the relation of the east coast fishing grounds and fishing villages. The chief concern being to bring the fish quickly to the market, the trade has become concentrated to a remarkable extent in the Thames, where the steam carriers, coming direct from the fishing

fleets at sea, run right up to Billingsgate Market, and at Grimsby, at the Humber mouth, where good dock accommodation and an excellent railway service bring the trawlers of the Northern Grounds into communication with all parts of the country. Hull, Yarmouth, and Lowestoft also derive benefit from the North Sea fisheries, and owe much of their importance to that cause.

Where the North Sea meets an arm of the Atlantic in the Strait of Dover, the narrowing of the dividing sea gives rise to the passenger traffic with the Continent which has been the making of Dover and Folkestone. The strategic as well as the commercial importance of Dover, commanding as it does the two seas, has justified the enormous expense of constructing a great naval and commercial harbour on one of the most unpromising sites along the whole coast, and has given rise to keen controversy as to the political wisdom of sanctioning attempts to build a bridge or bore a tunnel to overcome the insularity of Britain and give access by rail to foreign countries.

The south coast faces a deeper sea than does the east, but one less adapted for fishing by means of the trawl; and, except in the case of the mackerel, pilchard, and herring fishery of the west, little development has resulted from that industry. The shelter afforded by the Isle of Wight to the channels of Spithead and the Solent, and the depth of Southampton Water, running inland to within two hours by rail of London, have given immense and growing importance to the centre of the south coast. The commercial harbour of Southampton, the port for passenger embarkation to South Africa and by several lines to America, finds its naval counterpart in Portsmouth. The narrowing of the English Channel between the Isle of Wight and Portland Bill on the north, and the peninsula of Brittany on the south, gives occasion to the most westerly line of cross-channel traffic from Weymouth and Southampton to France and the Channel Islands.

The western extremity of the south coast partakes of the general character of the west. Deep inlets running far into the land form magnificent natural harbours, in the finest of which—Plymouth Sound—lie the naval dockyards of Devonport. Here the development of a large trade in the transfer of passengers and mails carried by ocean liners depends only on the ability of the railways to give rapid communication with the great centres of population, and an improved train service has brought Plymouth almost as near London in point of time as Liverpool is.

The west coast opens upon the Atlantic obliquely through St. George's Channel, and for the most part it faces the turbulent Irish sea, the depths of which are similar to those of the English Channel, and greater than those of the North Sea. The edge of the continental shelf with soundings of 100 fathoms runs from Ushant to off the west of Ireland, at right angles to the English and the Bristol Channels, so that vessels

even in a fog can find soundings and know their position long before there is any danger of running ashore. No other gateway of maritime commerce is so efficiently guarded by Nature against risk of shipwreck. Two important inlets, the large and wide Bristol Channel and the narrow Mersey estuary, run far into the land, one to the south and one to the north of the bold projection of Wales. The Bristol Channel, originally of value as an ocean highway leading to Bristol, has now greater importance from the ready outlet it affords to the coal-shipping ports of Cardiff, Barry, Swansea, and Newport along its northern shore. The Mersey is the chief entrance for American and West African trade to the densely peopled northern industrial area, most of the goods being landed or loaded in the docks of Liverpool and Birkenhead. It is the entrance, also, for the growing traffic by direct steamers through the ship-canal to Manchester.

The block of Wales separating south-western from north-western England runs out into two promontories separated by the wide sweep of Cardigan Bay. The southern promontory is cleft by Milford Haven, a harbour which has lost the advantage of its fine geographical position from the sea on account of its unfortunate geographical position from the land, lying as it does remote from the great centres. The northern promontory is the low island of Anglesey, where Holyhead, being almost in the straight line from London to Dublin, is naturally the chief port for communication with Ireland. Northward of the Mersey the sandy plain of Lancashire fronts a low shore, where a few small ports struggle against great natural difficulties. Barrow, one of the most purely artificial seaports in the country, draws its prosperity from the iron and coal deposits of the margin of the Lake District. The west coast of England terminates in the sandy shallows and treacherous tides of the Solway, an inlet of the sea resembling the Wash in its economic inutility.

The surface of England stands in close relationship to the nature of the underlying rocks, and the influence of the broad geological divisions can be traced through all the geographical distributions. Looked at as a whole, South Britain is divisible into three parts. The **Western Division** comprises three masses of uplands, all composed of ancient rocks much penetrated by old volcanic outbursts, and each attaining a maximum elevation exceeding 2000 feet above the sea. The Northern mass includes the Cheviots, the Lake District, and the Pennine Chain; the Western consists of Wales and the bordering hill ranges; and the Southern occupies the peninsula of Devon and Cornwall. The **Eastern Division** corresponds with the region of the Jurassic, Cretaceous, and more recent rocks. Few points within it attain an elevation so great as 1000 feet, and the hills which ridge its surface are for the most part escarpments, steep on one side and gently sloping on the other. The hard ancient rocks, with their treasure of the Coal Measures and their

volcanic dykes and bosses, are buried far beneath the surface. Between the two divisions the third stretches as a transition zone popularly known in its central part as The Midlands, but that name was not adopted for the map. On the south and east this corresponds with the plain of Lias clay, on the north and west with the plain of the Triassic red rocks separating the groups of the Western Division.

The rivers of England and Wales necessarily radiate from the elevated masses of land and flow across the bordering plains to the sea; but it is worthy of remark that, with the solitary exception of the Humber, no streams rising in the Western Division cross the Eastern Division on their way to the sea.

The climate of England and Wales is influenced to a considerable extent by the configuration of the land. If the land were flat and of uniform level the only factors affecting climate would be the heat received from the sun, which would diminish uniformly from south to north, and the prevailing wind, which would blow on the whole from some point between south-west and west-south-west. The result would be that in summer, when the sun is powerful, temperature would be highest in the south and lowest in the north; and in winter, when the sun is feeble, temperature would be highest in the west where the warm air from the Atlantic exercises its full influence, and lowest in the east. The temperature would, in addition, be more extreme—hotter in summer and colder in winter—than the latitude warrants in the centre of England on account of its distance from the sea, and in the south-east on account of its proximity to the Continent. The rainfall would be nearly uniform over the whole surface of the country, although in the region of more extreme temperature it would be less on the whole, while the falls in thunderstorms would be greater.

In reality the climate varies greatly from point to point, the conditions stated above being modified in the most intricate and interesting way by the configuration of the ground. The temperature of the air falls off, as the height above sea-level increases, at the rate of 1° Fahr. for each 300 feet, so that places on the high moorlands rising to 1500 feet or more are permanently, and at all seasons, at least 5° colder than places in the same latitude at sea-level. Where the land slopes towards the south, the rays of the sun fall more nearly perpendicularly on the surface, and their heating power is consequently greater; while where the land slopes towards the north, the rays fall more obliquely, and the heating power is less than on level ground; hence local climates of very different character exist in places which are in the same latitude and have the same height above the sea. The wind, though it usually blows from some westerly or southerly point and is relatively warm, frequently comes from northerly or easterly directions and is cold; and it necessarily happens that places on the east coast, or on the eastern side of high masses of land, are more exposed to harsh

and inclement weather than those on the western slopes. Where a range of hills or a line of cliffs protects a favoured spot from north and east and leaves it open to south and west, the warmest climate possible to our islands is produced, though it may be in a very small area, such, for example, as the sea-margin at Bournemouth and Torquay. It is to this cause rather than to their position in latitude that the mildness of the seaside towns of the south coast is due; while the sharp bracing climate of the Yorkshire coast and moors is in its turn the result of exposure to easterly and northerly winds rather than of latitude.

The effect of configuration upon climate is most marked in the case of rainfall. Moisture-laden wind may blow over a level expanse of country and produce little precipitation, but when it encounters a slope and is forced to rise into the cooler regions of the upper air condensation increases rapidly, and to a considerable extent the rainfall of the land increases with its altitude. The effect is, however, probably due to slope as well as to height, a steep hill causing the air to ascend for some time after the summit is passed, and so producing the maximum fall of rain a little distance beyond the summit on the leeward side. On account of this relationship, and because of the shelter afforded by a mass of high land to a plain to leeward, the rainfall map of England and Wales, while it corresponds very closely to the map of vertical relief, resembles a blurred impression. The famous centre of high rainfall at The Stye and Seathwaite in the Lake District, and the scarcely less wet valleys on the east of Snowdon, owe their character for intense wetness to this fact. The highest average rainfall occurs in the mountains of Wales, the Lake District, the Cheviots, and the Pennine Chain; and to a less marked degree on the high moors of Cornwall and Devon, and along the lines of the Cotteswold and Chiltern Hills, the Chalk Downs, and the Wolds of Lincoln and York. A narrow zone of low rainfall borders the coast on the west as well as on the east, and whenever a plain stretches inland, it forms a region of low rainfall. Even a comparatively narrow valley running up amongst hills maintains a lower rainfall along its floor than prevails on the bordering heights. Shelter also plays its part, and all causes conspire to make the driest region of England the inland portion of the low Eastern Plain which extends from the Humber to the Thames. The great dry area of England stretches westward to the Severn valley, and it is surprising to find how low a mean annual rainfall prevails close under the Welsh mountains, which drain the sea wind of its moisture. It sometimes appears that the rainfall begins to diminish with altitude after a certain height above sea-level is past; but it is more likely that the exposed position of the rain gauges on high hill-sides causes increased loss of rain on account of eddies set up by the wind about the gauge.

Vegetation is perhaps even more sensitive to variations of temperature and rainfall than to changes of soil, though in this connection

it must be noticed that a stiff clay subsoil, as in the Fenland, may retard the drainage of low flat land to such a degree as to counteract the effects of a low rainfall and produce a humid climate nourishing a marshy vegetation. The profitable cultivation of all farm crops ceases at a comparatively low elevation, and above 1500 feet, alike in the south and in the north, the vegetation is reduced to the plant-associations typical of moorlands—heather, fern, and mosses; trees have disappeared, and except when the moor is drained and cultivated, grass does not predominate. When the land rises to 2500 feet or over, the surface is usually of bare stones, scantily starred by a few stunted plants growing in the slight shelter between them.

Since cultivation is possible in the lower grounds only, it follows that the higher regions of the country are practically without population except where mineral resources are abundant and valuable. The highest land, though of little use even for sheep pasture, is essential to the life of the large towns of the valleys penetrating the high moorlands, and even to those of the more distant plains, for the collection of the rainfall in reservoirs for water-supply. So great is the demand for water in large towns, that there is now scarcely an uninhabited moor or upland in the whole Pennine chain which has not been set apart for water-supply, and in most cases efforts are made to remove all possible causes of pollution by keeping the ground free from crops or live stock.

The elevation and configuration in the Eastern Division exercise no direct influence on population, as no part rises above the limits of pasture, and very little is above the zone of profitable cultivation. An indirect influence is, however, produced by the geological formation, for the hills are permeable masses of chalk, limestone, or sandstone upon which no surface water is available, while the plains are covered with stiff clay, through which the water-bearing rocks may be reached at no great depth. Hence in the Eastern Division also the hill ridges, though often traversed for long distances by high-roads, are devoid of population, which throngs densely on the low ground. The Lincoln Edge, the Chiltern Hills, and in an even more interesting way the Weald, supply excellent illustrations of this fact.

Speaking broadly, and of course excepting seaports, the geological rather than the hypsographical map explains the distribution of population in England and Wales. Wherever mineral wealth or easily reached underground water is found, there are towns or close chains of villages; where neither is to be had, there are strips of country, even within 50 miles of London, which are totally uninhabited. It must be noted, however, that when it is possible to sink deep wells, or when it becomes profitable to pump a supply of water from a distance, as in the parts of the North Downs nearest London, modern residences have sprung up in large numbers, an accessible water-supply having been the one thing lacking for a dense population.

The Western Division.—The Cheviots form the most northerly mass of high land in England; the northern part, indeed, belongs to the Southern Uplands of Scotland. The Cheviots are grassy hills furnishing excellent pasturage for sheep, and giving rise to numerous rivers which flow to the North Sea, a number of south-flowing tributaries uniting in the Tyne, the narrow valley of which is joined by the Tyne Gap to a valley draining to the Solway, and the two completely isolate the Cheviots from the Pennine Chain. Through this gap runs the direct railway between Carlisle and Newcastle, and along its northern slope the Romans built their great wall against the Caledonians.

The Pennine Chain runs southward from the Tyne Gap as a broad moorland, loftiest on the western side, where it rises in summits of nearly 3000 feet, and sending rivers towards the east through long dales, the home of the sparse pastoral population of former days. In the Crossfell section the Lower Carboniferous rocks of the high moorlands give place upon the eastern flanks to the Coal Measures, and the lower valleys are the site of a dense coal-mining and iron-manufacturing population, the outlet for whose industry is through the seaports of the Tyne, Wear, and Tees. Crossfell itself is the culminating summit of the remarkably steep and straight escarpment which bounds the Eden Valley and faces the gentler heights of the Lake District, forming the nearest approach to the appearance of a mountain range in England.

The Whernside section of the Northern Pennines extends as a more broken and broader mountainous group from the valley of the Greta, a tributary of the Tees, to the Aire Gap, where the valleys of the Aire and the Ribble nearly meet. On the west it closely adjoins the Lake District; on the east its long dales widen as they descend between spurs of moorland to the broad Vale of York. Health and pleasure resorts, such as Harrogate and Ilkley, have arisen to take advantage of the fine air of the moors, the climate being in some instances the most valuable of the natural advantages.

Southward from the Aire Gap the Pennine Chain contracts in breadth, and the Southern Pennines, after rising to 2088 feet in the wild limestone plateau of Kinderscout in the High Peak District, subsides southwards in a series of radiating spurs separated by the romantic river valleys of Derbyshire. This section of the Pennine Chain is the most remarkable of the three. The Coal Measures crop out both on the eastern and the western slopes, giving to both sides of the country the character of mining and manufacturing districts. Chains of towns of every size run through the lower valleys. Some of these are mere aggregates of mean houses, sheltering miners and factory hands, stretched for dreary miles along the wind-swept upland valleys; others are great cities on the plain. Manchester and Oldham, with their satellite towns, stretch almost to Liverpool over the Cheshire Plain on the west

Leeds, Bradford, and Sheffield cling closer to the hills on the east, and form, with other woollen-weaving towns of the West Riding, a zone of seething urban life between the desolate uplands west of them and the quiet agricultural Vale of York to the east. Almost every valley in this section has its railway, and several are traversed by canals. The lofty ridge separating Lancashire from Yorkshire is surmounted by chains of locks on the canals, crossed at the passes by several railways, and pierced by others in tunnels several miles in length. It is one of the most striking instances in the geography of the British Isles of a natural barrier of a somewhat formidable kind overcome at the command of trade necessity. Sheep are still pastured on the slope of the moors, though practically all the wool employed in the manufactures is now imported. In some of the remoter valleys semi-domestic industries, especially paper-making on a small scale, still linger, the motive-power being supplied by water; but the coal-mines now determine the sites of all important manufacturing towns.

As in most regions of pronounced configuration, the boundaries of political divisions in the Pennine Chain follow natural features. The watershed running from north to south forms, with scarcely an exception, the county boundaries between Cumberland, Westmorland, and Lancashire on the one side, and Northumberland, Durham, and Yorkshire on the other. The boundary between Durham and Yorkshire is marked throughout by the river Tees; though usually the dales forming the valleys of the rivers are natural units, in which the old spirit of the clannish pride and perhaps the local jealousy of dalesmen of former days may sometimes still be traced.

The Lake District is a remarkable mountainous region separated from the Pennine Chain by Shap Fell and the divergent rivers Eden and Lune. It is scored radially by a series of valleys of remarkable beauty, most of them containing one or two long narrow lakes of considerable depth. Here practically all the natural lakes of England are comprised within a circle of 15 miles radius. The region rejoices in an excessive rainfall, due to its abrupt ascent in the track of the prevailing sea wind, and it is of little economic value save in the coastal plain, where there are coal mines and seaports. Its few inhabitants depend for their livelihood mainly on the tourists attracted by the beauty of its scenery and on the well-to-do residents to whom its literary associations make it a congenial home. The whole district is full of charm, for the beauty of a dry day in a land of rain amply repays the patience with which it may sometimes be awaited.

Two other small hill-groups, not unlike miniature Lake Districts devoid of lakes, separate themselves westward from the Pennine Chain and spread out into the Cheshire Plain. These have no comprehensive names sanctioned by local custom; but they may be called after the ancient forests of Bowland and of Rossendale.

They are now clusters of barren hills separated by valleys—the Bowland Forest group only silent pasture, the Rossendale crowded with small towns of factory workers and miners, with the great centres of Bolton, Bury, and Rochdale on the south, and Blackburn and Burnley on the north. Both groups are diversified by artificial sheets of water in the reservoirs, some of which rival natural lakes in size.

The peninsula of Cornwall and Devon has a distinct individuality amongst the natural regions of England. Its separation from the Eastern Division is accentuated by the small plains of Somerset and of the Exe, to the west of which rise the typical moorland masses of Exmoor on the north and Dartmoor on the south, separated by the Plain of Devon. These moors are desolate and dreary in the extreme, the last haunt of the wild red deer, and no more hopeless hold for prisoners of war could well be imagined than the huge building on Dartmoor, erected during the Napoleonic struggle and now the most forbidding convict prison in the country. The heights in Cornwall are less pronounced, but Bodmin Moor is a fitting companion to the moors of Devon, and the precipitous cliffs of the coast, veined with ores of copper and tin, afford an indication of the resources which made Cornwall a place of importance for centuries, and at one time, now many years ago, a leading centre of original scientific work.

Wales acquires its semi-independent position as an integral part of South Britain from historical considerations; but these are direct consequences of its position and configuration. Physically the Welsh Highlands include the hills of Shropshire, Hereford, and Gloucester west of the Severn, as well as the county of Monmouth, which is grouped for all practical purposes, and especially for statistics, along with Wales, though actually part of England. Although the Shropshire hills are of no great height, they are picturesque and prominent features, and stand in close agreement with the geological structure. The Malvern Hills rise in the Vale of Severn much as Charnwood Forest rises above the plain of the red rocks in the north of the Midlands.

The loftiest and most picturesque of the Welsh mountains are those of the north-west, which rise in two distinct divisions. Of these the Snowdonian group culminates at 3560 feet in Snowdon, the loftiest mountain south of the Scottish Highlands. Its flanks are trenched by valleys, in many of which small lakes or tarns still remain. The whole group of Snowdonia has a very high rainfall on account of the abruptness with which the mountain slopes rise from the level of the sea, fronting the wet west wind. This, with the centre of the Lake District and a portion of the North-Western Highlands of Scotland, can claim the distinction of being one of the few spots in Europe with a mean annual rainfall exceeding 100 inches. The industry of the district lies mainly in the great slate quarries; but the coast is lined

by health resorts, of which Llandudno, by reason of its sheltered situation and mild, dry climate, is the chief. To the south and east, beyond the valley of the Dee, which contains Bala Lake, the largest natural body of fresh water in Wales, the Berwyn Mountains form another belt of high ground running nearly at right angles to the trend of Snowdonia. While the steep north-western face of the mountain group drains through the Dee to the Mersey, the gentler south-eastern slopes discharge the copious rainfall through long valleys to the Severn. In one of these a great reservoir—Lake Vyrnwy, as large as Coniston Water—has been constructed for the supply of water to Liverpool. The great reservoir has a special geographical interest, for it has been formed by reconstituting an ancient lake-bed, and so restoring a feature of pre-glacial topography. This section of North Wales is for the most part uninhabited except for villages in the valleys, and the larger part of the population continue to speak no language but Welsh, so great is the isolation of the district from external intercourse.

Mid-Wales, between the valleys of the Severn and the Wye, is a rough plateau rising on the east and still higher on the west above the level of the centre. The eastern elevations culminate in Radnor Forest, the western form a nearly continuous chain, the Mynydd Bach, running at first south and then south-westward from Plynlimon. On the eastern flanks of this ridge new reservoirs for the supply of water to Birmingham have created two large and picturesque lakes in the valley of the Elan, a tributary of the Wye, one of which is as large as Bala Lake, the other inferior only to Windermere amongst the lakes of South Britain. This western ridge is not crossed by a railway for nearly 60 miles, and it has formed an almost complete barrier to communication between east and west.

The South Wales uplands are separated from those of the north by the Vale of Brecon, through which the Usk flows south-eastward. They culminate in the Brecon Beacons, the slopes leading up to which from the south are deeply scored by parallel valleys of southward drainage cutting through the Coal Measures, and consequently the scene of enormous activity in coal-mining and iron-smelting. All the principal valleys, and many steep and difficult gorges, are traversed by railways linking the mines and blast-furnaces with Swansea, Cardiff, Barry, and Newport, the ports of shipment on the coast of the Plain of Gwent. This region acquires imperial importance from its mines of anthracite, the smokeless coal which is peculiarly adapted for the furnaces of war-ships. The dense populations of the narrow valleys are still so recent that they have hardly given rise to any towns; even Merthyr Tydvil is in plan and appearance scarcely more than an overgrown village, though it houses over 100,000 inhabitants. Barry Dock was excavated in 1888 amongst the sand-dunes on a desolate piece of coast, in order to

afford a new outlet from the coal-fields of the high valleys to the sea, and within a few years it ranked as one of the great seaports of the world.

The compact group of the Black Mountain between the Usk and the Wye is a wild and desolate district, though on the margin of the fruitful plain of Hereford.

The Midlands.—The plain which surrounds the southern extremity of the Pennine Chain, separating it from the Midlands on the south, and from Wales on the south-west, is deepened into the Vale of Trent trending east and north, and the Cheshire Plain trending west and north. South of these slight depressions the Midlands rise to an undulating plain some hundreds of feet above sea-level. For the most part this district is formed of the Triassic red rocks, through which coal may be reached in many places, and so there have arisen, not only the great commercial centre of Manchester, but also the vast industrial aggregations of population in the Potteries about Stoke and Hanley, and in the Black Country to the north and west of Birmingham. The development of the mineral wealth of the Black Country has a somewhat remarkable history, for when the old ironworks deserted the forests of southern and eastern England on pit-coal taking the place of charcoal in smelting, coal-pits were at hand to supply the ironworks near Birmingham, which formerly drew their supplies of charcoal from the Forest of Arden. The Midlands are diversified by hills of ancient rock rising like islands through the newer strata of the plain. Of these the most remarkable are Charnwood Forest to the north-east and the Wrekin to the north-west. The Vale of Severn separates this region on the west from Wales, and forms a region peculiarly favoured by soil and climate, for it combines the warmth of the west with the dryness of the east.

The Eastern Division.—The physical character of the Eastern Division can be understood best when the geological map is superimposed upon that of configuration.

The predominant features are the long lines of low hills of limestone or chalk rising with a steep face on one side, usually the north or west, above a plain of clay, and sinking with a gentle slope to the opposite side, usually the south or east, beneath a plain of clay similar to the first, so far as appearance is concerned, but of more recent origin geologically.

The line of limestone hills, forming the Oolitic escarpment of the geologists, commences with the Cotteswolds, which, attaining a maximum height of 1000 feet, run with a curved front along the eastern margin of the Vale of Severn, and the southern margin of the Vale of Evesham. The hills are tunnelled by several lines of railway on their way from London to the west of England, and crossed by one line of the Great Western, as well as a canal, winding through

the Gap of Stroud. The pasturage on these hills supplied wool in old days for a spinning and weaving trade, which still survives in the production of West of England cloth. The line of the Cotteswolds is continued in Edge Hill, and further to the north in the less pronounced ridges of Northamptonshire; but even where the escarpment fades into the low Lincoln Edge or a mere cliff along the right bank of the Trent, it remains a distinct feature in the landscape. Beyond the Humber the limestone hills reappear, bounding the Vale of York, on the east, and rising in the North York moors and the Cleveland Hills to just over 1000 feet. In the Cleveland Hills overlooking the estuary of the Tees valuable ores of iron occur, and have been the determining cause of the great iron industry which gave rise to Middlesbrough. The plain of Lias clay at the base of the Oolitic escarpment forms the rich agricultural belt of the Midlands, with Leicester as its most important town, and the beautiful sylvan scenery of the "Dukeries," perhaps the most typically English landscape in the country. The number of ancient towns, of no great size, but with historic names which belong to this belt of country, is worthy of note, and points to a time when the conditions determining the distribution and growth of centres of population were totally different from those now in force. The quiet old cathedral cities and market towns flourished in full activity when the Church had a monopoly of learning and the farmer a monopoly of trade, and they naturally failed to expand with the growth of manufactures carried on by means of mechanical power.

The northern line of Chalk hills rises in turn over a rich agricultural plain of clay, under which the gentle slopes of the Limestone hills dip, and forms a series of bare and rounded heights without inhabitants, and valuable only for pasture. They run through Dorset as the Western and the Purbeck Downs, form the northern edge of Salisbury Plain, and then the short chain of the White Horse Downs leading to the central portion known as the Chiltern Hills, which sink north-eastward into the East Anglian Ridge, reappear again beyond the Wash in the Lincoln Wolds, and beyond the Humber in the Yorkshire Wolds, which end grandly in the white chalk cliff of Flamborough Head. On the clays and water-bearing Greensands at the base of the Chalk escarpment there is almost everywhere a line of villages and small towns where the scanty population of purely pastoral and agricultural parishes is concentrated. The continuity of the Chalk hills is more geological than geographical; at their highest they are completely cut through by rivers, as in the Thames Gap below Oxford, which draws a natural line between the Upper Thames Basin, formed by converging valleys on the long slope of the Cotteswolds, and the Lower Thames Valley, which lies on the London Clay. Towards the east the Chilterns sink to a mere ridge on the great Eastern Plain, which sweeps through the east of England from the estuary of the Thames to the Vale of York.

The Eastern Plain is lowest in its central portion around the shallow Wash, where it forms the almost Dutch district of the Fenland, a sort of saucer of clay filled with a nearly level sheet of silt and peat. Some of it is below mean tide level. Much of it has been artificially drained and embanked, and wherever a bed of gravel or some portion of the underlying rocks penetrates the surface and rises more than 25 feet above the sea, it forms the site of an ancient town clustered picturesquely round a still more ancient church. Ely with its cathedral is the finest type of a purely Fenland city.

The lower Thames valley occupies a hollow in the Chalk filled with clay and gravel, and its low level and gentle slope allows the tidal influence to extend a very long distance from the sea. Here at the head of ocean navigation, the vast conglomerate of municipalities known collectively as London has arisen and is steadily extending on every side, in complete disregard of natural conditions, for proximity to London makes a marsh or a steep hillside equally worth reclamation or terracing into building sites. The geological formation secures a vast natural water-supply in the saturated Chalk lying below the impermeable layers of clay. Artesian wells bored through the clay tap this supply, which is derived from the ring of Chalk hills surrounding London at a distance still beyond the suburban area; but year by year the wells have to be deepened to keep pace with the ever-sinking level of saturation. Thus it has come about that every natural condition which favoured the original foundation and early growth of the capital of the British Empire has ceased to exercise any influence upon it, and London grows now because the demands of centralized national life require it to grow from the centre that has been fixed by immemorial custom.

South of the Lower Thames Valley the district of the Weald occupies the south-eastern corner of England. The Hampshire Downs, running eastward from Salisbury Plain, divide and proceed as the North Downs and the South Downs to the sea at Dover and Beachy Head respectively. The steep faces of these two lines of Chalk hills look towards each other across the clay-covered plains of Kent and Sussex, separated by the sandstone upland of the Forest Ridges. The northern slope of the North Downs dips below the clay of the Lower Thames Valley, the gentle slope of the South Downs dips similarly below the similar clay of the Plain of Selsey. The rivers rising in the Forest Ridges breach the Chalk ring of the Downs at numerous points, each gap permitting the passage of roads and railways, and each an important strategic point which must be protected in any scheme for the defence of London. The Downs until recently were totally uninhabited ranges of sheep pasture, and though they are now being built upon as the healthiest spots in the immediate neighbourhood of London, the ancient chain of small towns and villages built on the narrow terrace of the Upper

Greensand between the Chalk and the clay remains to attest the harmony established between the village organism and its environment in the days of normal development, before the external attractions of London dwarfed all other considerations.

THE FULANI EMIRATES OF NORTHERN NIGERIA.

By Major J. A. BURDON, F.R.G.S., Resident of the Sokoto Province.

Before turning to the special subject with which this paper deals, namely the Fulani emirates of Northern Nigeria, I think I ought to say a few words on Nigeria as a whole, in order to show why my remarks are confined to one particular district, and to prevent the idea that the description which I shall give is applicable to the whole of Nigeria, or even to the whole of the Northern Protectorate.

Nigeria, an English-made name given for convenience to the British protected territory, the principal feature of which is the lower Niger river, is divided into two Protectorates by a line running east and west at about the 7th parallel of latitude. This line very nearly coincides with a natural boundary—that between the open bush and grasslands of Northern Nigeria and the dense forest of Southern Nigeria. The division is, of course, not as abrupt as such a line would imply. From the Sahara southwards to the coast there is a gradual change in every condition, the central pivot of the change being the increase in rainfall. The sandy plains of the north with their stunted thorn bushes gradually merge into rich soil with a prolific undergrowth and trees of varying value; this grows into the luxuriant vegetation of the dense low-lying forest, with its wealth of timber, rubber, and oils; and this again loses itself in the mangrove swamps of the Niger Delta.

As with climate and nature, so with man. From the light-coloured, straight-featured Fulani, one passes through many gradations to the typical negro of the coast. The characters of the two types are as different as their looks. Ethnology teaches us the effect of environment on race, and it is therefore easy to understand why the forest and swamp-dwellers of the south should be of a lower type than the inhabitants of the open northern plains. But history tells of the southward movement of superior races from the north, and it seems probable that this pressure has forced coastwards inferior aboriginal plain-dwellers. Whatever be the cause, the important point to remember is the very great difference which exists, both in character and appearance, between the inhabitants of the northern plateau and the natives of the southern forests.

England pictures West Africa as peopled by "niggers," by the type

of negro whom it helped to degrade by the over-sea slave trade; for the Mohammedan states of Northern Nigeria this picture does not hold good. The offensive name of nigger is as applicable as it is objectionable to the dignified Hausa and Fulani. Not only did this tract escape this product of European civilization, but we have there an entirely different type, a higher race, one from which great things may be hoped in the future, and which will assuredly make its mark in the collection of races that constitute the British Empire.

As with nature and man, so with religion. Islam, from Egypt, from the Mediterranean littoral, from Morocco, has pushed southwards,

Maijindadi. Mohammadu Maiturare. Malam Akal.

NATIVES OF SOKOTO. MAIJINDADI IS A TYPICAL HAUSA. OH. MAITURARE IS A FULANI ON THE PATERNAL SIDE, BUT HIS MOTHER AND GRANDMOTHER WERE OF NEGRO RACES. MALAM AKAL, ON THE OTHER HAND, IS HAUSA ON THE PATERNAL SIDE, BUT HAS A CERTAIN AMOUNT OF FULANI BLOOD ON THE MATERNAL SIDE.

but during the past century mainly by conquest. Propagated thus by a race of horsemen, it has been effectually checked in its southward march by the tsetse-haunted forests, where no horse can live. And we thus see a steady decline from the devout civilization of Islam, fanatical along the Mediterranean, tolerant south of the Sahara, ignorant and careless towards the southern Fulani emirates, and thence merging into paganism, which increases in degraded superstition till it culminates in the human sacrifices of Benin.

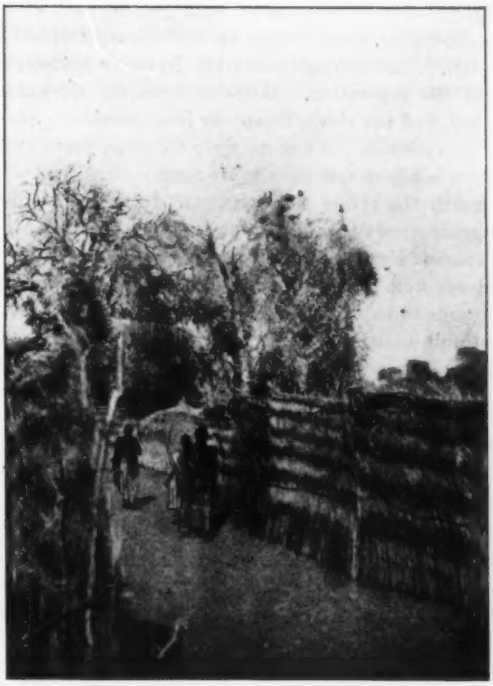
That there can be no community of interest between the extremes is self-evident; but the important point for British rule is the intense

hostility which exists between the two systems, Islam and paganism, at their point of contact. Along the lower Niger and the Benue, stretching east and west between the 8th and 9th parallels of latitude, lies the northern line of paganism, reaching out arms to the north, where inaccessible hills afford protection against the Mohammedan cavalry. Raided incessantly for a century, almost exterminated in parts, these wild tribes regard Islam as synonymous with ruthless aggression, its professors as their natural enemies. Not only can there be no possibility of community of thought or action between types so utterly opposed in language, character, and religion, but I am convinced that in the most improbable event of a concerted attempt by the Mohammedan states to throw off British rule, we could safely rely on this pagan belt to stand fast on our side against their hereditary foes. The converse is also true. Trouble on the lower Benue has no possible connection with any northern state. *À propos* of a recent punitive expedition in the Bassa province, I have come across the wildest ideas as to its possible effect on Nigeria as a whole. There can be no such effect. Isolated risings in these southern pagan tribes affect the Fulani emirates as little as dacoity in Burmah affects India.

With such varying conditions, it is evident that no general description of Northern Nigeria can be given in brief. For such wider view, I would commend all interested to the striking papers read lately by the High Commissioner of Northern Nigeria, Sir Frederick Lugard, before the Royal Geographical Society, and by Lady Lugard before the Royal Colonial Institute and the Society of Arts. And I will now turn to that western portion of Northern Nigeria in which I have served for nearly eight years, and especially to the Fulani emirates of Bida, of which I was Resident for a year, and of Sokoto and Gando, which lie within my present province.

From the northern boundary of British territory, at about the 14th parallel, to the junction of the Niger and Benue just south of the 8th parallel, there extends a laterite plateau, cut in two at about the 10th parallel by the granitic belt in which lie the Niger rapids, and which runs east through the Kontagora and Zaria provinces. The laterite is a thin layer of igneous rock containing a large quantity of iron; it is quite flat, in places covered by a thin layer of soil, which bears scanty grass and stunted trees, in others bare, ringing underfoot, disastrous to the feet of unshod ponies, and very hot and uncomfortable to march over. This ironstone cap overlies various soft rocks, clays, and soft sandstones. Through it the Niger and its affluents have cut themselves broad flat valleys, on either side of which rise steep scarps, increasing in height above the valley-level from 100 feet in the north to some 1000 feet in the south, as the river falls towards the coast, but always ending in the hard straight edge of the plateau table. The rivers are plentiful, and thus the plateau is cut into a succession of table-topped hills.

The hilltops, owing to want of water, are seldom inhabited, and are only cultivated where pressure of population makes the valley lands insufficient. The view through the orchard-like trees is limited to some 50 yards, and in the wet season, when the grass grows over one's head, to little more than one's horse's ears. Grass! A most misleading name to those who only know the soft turf of England. There it means



A STREET IN SOKOTO, SHOWING HOW GRASS MATS ARE LARGELY USED AS WALLS, OWING TO THE POORNESS OF THE SOIL AS BUILDING MATERIAL. THE FIGURES ARE WOMEN. THE TREES IN THE BACKGROUND ARE COVERED WITH THE NESTS OF MARABOUT STORKS.

bare blackened earth studded with dried-up tussocks in the dry season, and coarse, overgrown reeds in the rains.

The valleys, where a prolonged state of war has not depopulated the country, are dotted with small walled towns or farm hamlets. The scrub bush is cleared, every acre is cultivated, and the farms are studded, except close to the larger towns, with various accacia and other food-producing trees. The sense of peaceful prosperity is a welcome relief to the monotonous emptiness of the uninhabited bush. It is hard to

depict the dreary monotony of the scenery without seeming to make it out utterly unlovely, which it is not. But imagine the same geological formation, the same shape of hill, the same kind of tree, the same type of town, for mile after mile. What would England be like if such geological sameness existed from the Isle of Wight to the Tweed?

The word "river" again conveys an inadequate picture of the waterways of Nigeria—broad expanses of dark rushing water in the rains; blistering sand-tracks, soon overgrown with dense tropical bramble, in the dry season. The tearing floods are Nature's weapon against the luxuriance of the vegetation. Without them the river-courses would become choked, and the rivers disappear into marshes. Such a change has been in operation in the Sokoto river for some years past, but steps have now been taken to restore it to its normal condition.

In the north the rivers flow through flat, marshy plains which, before the grass grows too high, afford pasture to the vast flocks and herds of the nomad Fulani. These marshes are devoid of trees. To the south the rivers flow through belts of dense forest, varying in width from a few yards to half a mile. In these belts, with their fetid pools and impenetrable undergrowth, lurks the deadly tsetse fly, barring the way south to cattle and horses. But, on the other hand, it is in this jungle that are found the valuable forest products, timber, kola trees, and oil palms.

Along the marshy plains and grassy uplands of the north extend the pastoral Fulani, scattered through the territories of the agricultural and trade-loving Hausa peoples, nomads wandering through the lands of town-dwellers. Exactly a century ago a Fulani Sheikh, Othman Dan Fodio, a mallam, or schoolmaster, who had been tutor to Yunfa, the then King of Gobir, forgot his position, and dared to dispute the orders of his old pupil, now his king, and brave his wrath. Yunfa, incensed, ordered his death, and on his resisting, ordered the slaughter of every Fulani in the land. The natural result was that all the threatened race flocked to Othman for their own salvation; and Yunfa, coming with his army to execute his vengence, met a compact body of desperate men, and was utterly routed. This battle of Koto, or Rugga Fakko, fought in 1804, a few miles north of Sokoto, started the Jihad, which ended in placing Fulani rulers over most of the Hausa States and several others.

In its beginnings the struggle was purely racial, the attempted extermination of an alien race by the inhabitants of the land. It was not a sudden, unprovoked religious war for the forcible conversion of the country. Yunfa himself and many of his people were Mohammedans; but apparently the bulk of the Gobir people were still pagans, whilst all the Fulanis were devout Moslems. Consequently, the victory was attributed to the help of God and the power of the faith; and the

Fulani, who had hitherto spread their religion by peaceful proselytism, turned the racial struggle into a Jihad, or religious war. This at once brought to their side large numbers of the indigenous peoples who had already embraced Islam, and thenceforward the struggle became a civil war, or rather a rising to overturn existing authority.

The mallams, the preachers and schoolmasters, who had been the religious leaders of the converts to Islam, now naturally took the leadership of the religious revolts. In Kano and Nupe, to take two historical instances, the old dynasties were thrown down by their own subjects, and the Fulani mallams, as religious leaders, were carried into power on the crest of the religious wave. They took to themselves the palaces

SOKOTO HORSEMEN.

and titles of the old kings, and procured a sacred banner and official recognition from Othman, or his representative at Sokoto or Gando. Thus it was that the new states came to regard one or other of these two dynasties as their religious and temporal suzerain. But, with the exception of the leaders who were thus translated to power, the Fulani conquest made little change in the Fulani race as a whole. The typical portion of it still retains its nomad pastoral character.

The great difference existing now between the ruling caste and the herdsmen from whom that caste sprang only a hundred years ago, is most remarkable. The herdsmen are peaceful and inoffensive; they became warriors through the necessity for self-defence; when the crisis passed they reverted to their hereditary occupation; but they are brave

in the extreme, trusting for the defence of their treasured herds, their one possession, to neither horses nor armour, but only to their spears and their desperate courage. The ruling caste pride themselves on being warriors, but their trust is in their horses, armour, and drums; they take a very wholesome care of their own skins, and their aggression, unless they are lucky enough to take their enemy by surprise, frequently ends in an ignominious retreat. This is perhaps natural after a century of degeneration; but the curious point is that this was their characteristic in the time of Clapperton, 1826, twenty-two years after their rise. The herdsmen have retained their original abstemiousness and their contempt for finery and comfort of any kind. They are mainly monogamous, and by rigidly abstaining from inter-marriage with the black races have maintained the purity of their type. The rulers, through four generations of polygamy and concubinage with every kind of tribe, have become undistinguishable from the negro—black, burly, and coarse-featured.* They have almost entirely discarded their own language, which is looked on as a rather shameful badge of connection with the despised herdsman. Love of luxury, finery, and pomp is one of their chief characteristics. Sokoto itself, however, is an exception to this last statement; there luxury is considered irreligious. Tradition says that of old every Fulani, both boy and girl, was a scholar. Now, amongst the town-dwellers, it is rare to find an educated man outside the professional scribes and schoolmasters, and even they are mostly Hausas. The boys play truant from school, and the parents are too careless to use compulsion.

And yet in force of character the ruling Fulani is a far finer man than his nomad brother. The latter has an uncivilized, bucolic stupidity; the former is generally a straightforward, intelligent gentleman, pleasant to deal with and work with. He is also a fine ruler, stern, but just and patient. Let me give two instances of the last two qualities.

At the end of 1902, before the occupation of Kano, a native agent of the British Administration was buying transport animals in that city. A Kano trader, having taken his money, refused to hand over the purchases. The agent took the case to the native courts, and though the emir was fortifying his town and openly defying the Government, and though all Kano knew the complainant to be the white man's agent, yet judgment was given in his favour, and, what is more, settlement enforced by the city authorities.

In the middle of 1902, a Resident had a most difficult matter to settle between an emir and a subordinate chief. The latter, a man of a lower race, behaved at the interview in such a foolish, unmannerly way,

* Sar. Musl. Marafa.

as to render a settlement apparently impossible. The Resident was on the point of throwing up the matter in despair; but the emir, begging him to have patience, gave him a lesson in diplomacy, and after a couple of hours of most patient and dignified reasoning, won over the reluctant subordinate, and achieved the settlement where the white man had failed.

Of course, one obvious reason for this development of character and intellect is the position, duties, and responsibilities of rule. But I believe that admixture with the more sturdy black type, the agriculturist, trader, artisan, and townsman in general, has had much to do with the evolution of the simple shepherd into the courteous man of

THE TOMB OF OTHMAN DAN FODIO AT SOKOTO. THE BUILDING SHOWS THE BEST ARCHITECTURAL EFFORTS OF THE FULANI, WHO ARE FAR BEHIND THE HAUSAS OF KANO IN THIS RESPECT. IN FRONT OF THE TOMB IS A GRASS-MAT WALL. THE TOMB IS CAREFULLY LOOKED AFTER AND KEPT IN GOOD REPAIR. IT IS AN OBJECT OF VENERATION TO THE FULANIS AND TO THE MOHAMMEDANS OF NORTHERN NIGERIA IN GENERAL.

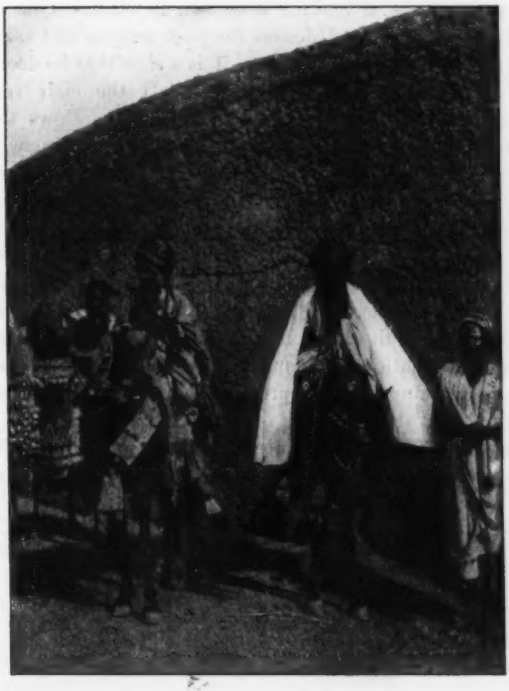
the world. The difference that, I am told, exists between the Fulani rulers I am describing and those of the eastern provinces tends to confirm this view. It may be that residence amongst peoples lower than these of the west has tended to lower the type. But there remains the fact that they have retained their own language and to some extent their purity of race. This probably has something to do with their less amiable character.

The degree of resistance to the Fulani conquest varied very greatly in various parts. Kano, desirous of peace for the sake of trade, settled

down very quickly. Katsena endured a siege like that of Troy. Kebbi, after a few years' acceptance of Fulani rule, revolted, and has maintained its independence ever since. And Gobir, against which the Jihad originated, has never been conquered at all. The existence of these two foci of independence has undoubtedly made for peaceful settlement throughout the remainder of the Sokoto province; for malcontents, instead of continually revolting as they did in Nupe, simply migrated into the independent territories. To the south, where there was no pre-existing Mohammedanism to pave the way for the Jihad and assist it by civil war, the result of the Fulani conquest has been wholesale depopulation. Refusal either to accept Islam, or to submit and pay tribute, postulates war to followers of the Koran. So whole districts have been carried into slavery or driven to take refuge in mountain fastnesses. Unhappily for the Fulani, it is this district, this result of their rule, that has come most prominently to English notice, being close to the waterways and therefore under the eyes of the former British administrators. And the Fulani has thus earned a name for ruthless oppression, which under happier circumstances he shows to be undeserved. Where prolonged resistance was not the case, the Fulani conquest of Hausaland seems to me to have been similar to, only far milder than, the Norman conquest of England. The indigenous populations retained their lands and hereditary offices. Only the dynasties changed. And apparently the new rulers accepted and carried on the constitutions they found in the various states.

The details of the state systems differ considerably in the different emirates; but underlying them all is the very deep-rooted desire for constitutional government. The emirs are elected by the will of the people as voiced by the Council of Elders, and this council must be consulted by them in their public acts. The fact that a district chief does not command the loyalty of his people is a sufficient reason for his removal by his overlord. On a new chief being nominated, he is presented to the headmen of his district or town, and they are asked whether he is the man they desire and will obey. And the most serious charge that can be made against an emir is that he rules without consulting his council. Such an one was Abd Errahman, the emir of Sokoto, who died in the autumn of 1902. He was a veritable tyrant, neglecting the advice of his officers, guilty of most arbitrary and unconstitutional acts, choosing his subordinate chiefs without reference to the wishes of their subjects, thereby causing frequent civil wars, and allowing his sons to annex, misrule, and oppress in a way that made both his name and theirs to stink in the nostrils of his people. And so he won his nickname, Dainyan Kwosko, "the unbaked potsherd," the jar that cannot be trusted to carry water, the untrustworthy; and by this name he was known and hated throughout the length and breadth of Hausaland. But as Sarikin Muslimin, to give him his native title,

Emir Al Mumenin, Commander of the Faithful, he was both endured and obeyed (with one notable exception) to the day of his death, a fact which speaks well for the law-abiding instincts of his people.



THE SARIKIN (= KING OF) TAMBAWEL, AN IMPORTANT TOWN SOUTH-WEST OF SOKOTO. IN THE BACKGROUND IS THE HIGH SUN-DRIED BRICK WALL SURROUNDING HIS COMPOUND.

But let me describe to you what I regard as the ideal Fulani constitution, that of Bida. In the first place, the fundamental principle is the intense veneration for age which the Fulani and Hausas possess in common with the Arabs and other Semitic races. With them our admiration for the energy of youth has no place, nor can they appreciate our frame of mind that despises dotards and senile folly. Promotion through the various offices of state up to the highest is a matter of selection based mainly on seniority.

The state at Bida is composed of three parts, very comparable to our three estates of the realm. At the head there is the emir, or king, with whose appointment I shall deal later. Next to him is the Council of Princes, corresponding to our House of Lords, not hereditary as from

father to son, but only so as confined to members of the ruling family, descendants of the founder of the dynasty. It consists of a succession of titles or offices in a carefully graduated order of precedence. The method of appointment is most interesting. The emir allows it to get about that he thinks of making a certain appointment or promotion. If the individual mentioned desires the post, he goes and asks the emir to give it him. If he does not do so, it is a sign that he does not want the rank, and another name is suggested. If the emir receives the request, he promises it his favourable consideration, allows this fact to be published, and then waits for a month or so to see whether the proposal is acceptable to the people. If no notice is taken of the suggested promotion, the matter is dropped as unpopular. But if congratulations pour in, and the officer elect begins to be universally addressed by the new rank which is promised him, it is a certain sign that the appointment meets with approval, and it is then carried into effect. Is not this a very striking form of the idea of representative government? When the day comes when we may take the native into a still closer association with ourselves in the administration of the country, here is the nucleus of representation and self-government ready to build on.

Through these Council of Princes the future emir enters the service of the state, climbing the ladder of promotion by force of character,

NATIVE COMPOUNDS, SOKOTO. THIS SHOWS THE TYPE OF HOUSE USED BY THE UPPER CLASSES—A GROUP OF HUTS, ROUND OR SQUARE, SURROUNDED BY A 6-FEET MUD WALL.

NATIVE HORSEMEN AT SAINYINNA. THE TOWN OF SAINYINNA IS SHOWN BY THE LINE OF TREES IN THE BACKGROUND. THE FOREGROUND IS FARM LAND—STUBBLE. THE SCENERY IS VERY TYPICAL OF THE SOKOTO PROVINCE.

wealth, and public service till he reaches at a ripe age the position of heir-apparent, from which he succeeds by right to the emirate. His first act then is to appoint his heir, his selection being limited to those members of the council whose fathers have held the emirate, and who are themselves generally fitted, especially by seniority, for the post. There can be no chance of an emir's son succeeding direct to his father. He is a mere nobody until he has climbed the ladder of promotion along with his cousins and other distant members of his family. Of course such a system gives rise to much favouritism and bitter quarrels; but, on the other hand, it is a safeguard against incompetence and rank unfitness.

And third comes the Council of Commoners, our House of Commons. This is composed of all men not of royal blood holding important state offices, the waziri, vizier or prime minister, the commander-in-chief, chief justice, chief liman or preacher, and the principal officers of the emir's household, these latter being mostly slaves. The method of appointment to this branch is very much as for the other. The two branches do not deliberate separately or apart from the emir, and only when called on by him. The whole council must be summoned for the consideration of all important matters; but the ordinary routine of state is carried on by a privy council composed of the two principal officers of each branch, who are in constant consultation with the emir. But it is important to note that the head of the council is the waziri,

the leading commoner; it is he who is second man in the state, not the heir-apparent.

It appears to me an extraordinary thing that a race of nomad shepherds, whose own system was probably purely patriarchal, should have been able to build up such a constitution. I cannot help thinking that the Fulani conquerors must have found it in existence with the Nupe dynasty they deposed. Two facts seem to point this way. First, the names of the titles and offices are mainly Nupe, and not Hausa or Fulani. And second, no such elaborate constitution exists in Sokoto or Gando, which are not old indigenous states, but were carved out by the conquerors from the outskirts of states which continued to exist, Gobir and Kebbi.

I may perhaps have given you too rose-coloured a picture of the Fulani. He has, as I have hinted, his dark side of oppression of subordinate races, enslavement of those who resist him. But I hold that to get the best out of a man one must find out the best that is in

JABUMAI, THE CONFIDENTIAL MESSENGER OF THE EMIR OF ARGUNGU, SHOWING THE DRESS OF A MOUNTED MAN FOR ROUGH WORK. THE SUBJECT IS A HAUSA, A NATIVE OF KEBBI.

him. It is that best that I consider, and which I have tried to picture to you.

If I have succeeded in infecting you with any of the admiration I feel for these systems and their rulers, your natural question will be, "What is the attitude of the British Administration towards these states?" Briefly, it is construction, not destruction. Our aim is to rule through the existing chiefs, to raise them in the administrative scale, to enlist them on our side in the work of progress and good government. We cannot do without them. To rule directly would require an army of British magistrates, which both the general unhealthiness of the country and its present poverty forbid. My hope is

GROUP OF NATIVE HORSEMEN, SHOWING PARTICULARLY THE ASBEN OR TUAREK SHIELD, MADE FROM THE SKIN OF A WHITE ANTELOPE (SOME SPECIES OF ORYX) FOUND IN THE SOUTHERN PART OF THE SAHARA.

that we may make of these born rulers a high type of British official, working for the good of their subjects in accordance with the ideals of British Empire, but carrying on all that is best in the constitution they have evolved for themselves, the one best understood by, and therefore best suited to, the people. Our present task is to gain their confidence. Without this there can be no real progress. The first step is to uphold and strengthen their authority over their subjects. This has necessarily been greatly weakened by their defeats at our hands. Its rehabilitation is slowly progressing, and is gradually inducing a sense of gratitude and trust.

Since the fall of Sokoto and Kano the papers have frequently spoken of "the downfall of Fulani rule." Inasmuch as the Fulani was previously supreme, and has now had to acknowledge a superior, the expression is accurate. But from the point of view of the subject population it is not true. The Fulani still rules, collects taxes, and administers justice. It is their old dynasty that the people have to obey, and therefore it cannot be said that the Fulani empire has fallen. Such a statement pictures the wiping out of an existing dynasty, the usurpation of kingship by a conquering race, and it is therefore misleading to the British public. There is, of course, a suzerain power which guides the ruler, a supreme court of appeal beyond him. But what has happened is that the Fulani States have become self-governed portions of a world-wide empire, not that as states they have ceased to exist.

And what is the attitude of our new fellow-subjects towards us? Our occupation is too recent to allow of a definite answer. Farmers whom the Pax Britannica has allowed to flock back to their long-desolate homes and lands; traders who are safe from pillage and extortion; war-swept towns which can now sleep in peace; individuals and individual communities are grateful for the benefits we have conferred. And this gratitude I believe will increase till it permeates public opinion. But there cannot but be an underlying feeling of resentment for some time to come. Rulers who have been deprived of their absolute power cannot be grateful, even though they are now bound to us by ties of self-interest. At present they are only grateful in a negative way, intensely relieved to find that the conquest they so dreaded interferes with them so little, and with their religion not at all.

A most important factor for the future is the intensity or otherwise of Mohammedan fanaticism. In this respect we have cause for thankfulness. The sect to which the Emir of Sokoto and the vast bulk of his religious adherents belong is that of the Kadiriyah, the most tolerant sect known to Islam. And the Senussiyah, the thundercloud of North Africa, have obtained no footing in the states that acknowledge the representative of Othman Dan Fodio as Commander of the Faithful, and are not likely to do so as long as his religious influence remains.

I personally am sanguine enough to hope that the present negative feeling may be fostered into active loyalty. A little while ago, in a town where less than a year before men had died happy cursing us as infidels, the Resident lay dangerously ill. He was publicly prayed for throughout the mosques. The fact came to his knowledge accidentally after his recovery. It is easy to lay undue stress on this incident. But remember what Mohammedanism means, and I think you will agree with me that the possibility of such an act

gives the most hopeful augury for the future of British administration amongst these latest recruits to our Mohammedan fellow-subjects of the King.

CAPTAIN J. LIDDELL'S JOURNEYS IN THE WHITE NILE REGION.*

We have received from Captain J. Liddell, Director of Posts and Telegraphs in the Anglo-Egyptian Sudan, an account of some journeys made by him early in 1904, in the country bordering the White Nile on the east, between 6° and 10° N. Coming from Meshra-er-Rek in the Bahr-el-Ghazal province, Captain Liddell struck the Nile at Shambe, and ascended by steamer to Abu Kuka (a little village south of 7° N.), his object being to try to push east of the Bahr-el-Jebel to the Twi district, while it seemed possible that the country in this direction might here be less swampy than elsewhere. On making the attempt, however, the swamps proved impassable on foot, though information was obtained which showed that water-communication exists between Abu Kuka and Twi. On endeavouring to trace this waterway in dug-out canoes, Captain Liddell passed by a "spill" from the Bahr-el-Jebel into a swift-flowing river, called by the Dinkas Abogwi, which, so far as seen, would be easily navigable for a steamer; time, however, did not admit of his reaching Twi, it being necessary to catch the steamer going north, and further exploration here was postponed for the time being.

Proceeding down the Nile to Taufikia, near the Sobat mouth, Captain Liddell started for Twi on February 25, with camels and an escort of twenty gehadia, by an overland route to the east of the Bahr-el-Zeraf. During the first few days several khors were crossed, the two first having Shilluk villages on their banks; they were from 200 to 300 yards in width, and, though nearly dry at the time, would be beyond a man's depth in the rains. Khor Diar is said to come from a large "birka" at Duk (this being fed by a khor which comes from the Bahr-el-Jebel at Bor), and to join the Bahr-el-Zeraf just south of the Jebel zeraf visible hereabouts across the plain. When there is a high Nile, it is said to flood a large area. The country is an open plain, with "heglik" trees and small talha scrub in places. For a few miles north of the Dinka village of Fulfam, the preceding high Nile had flooded the country—an exceptional occurrence—and ruined the crops. The homesteads, both at Fulfam and in all the villages as far as Twi, are very much scattered. As the water in the "fulas" (tanks) becomes low, the natives dig a series of circular holes round their circumference and of a greater depth, draining the water into them in order to economize it as much as possible. Beyond Fulfam the country had again been

* Map, p. 708.

flooded by the exceptionally high Nile, the water coming from two khors which lie further east, and are said to leave the Nile at Bor. Jual is a village of considerable extent, containing a mixed population of Dinkas and Nuers—the former apparently predominating. The people own considerable numbers of cattle, some of which they graze near the Bahr-el-Zeraf, and some inland to the east. Both this village and another named Lual are under a female sheikh, chosen as successor to her father, who had built a big "kenisa," or church, and had no sons. The sheikh of Khandak, Faragalla by name, was a Dinka who had been in the old army at the fall of Khartum, and can read and

DINKAS AT SHAWAI.

write. He was most friendly, and seemed to stand in some awe of his Nuer neighbour Diu, who is said to have joined Dengkur, a chief against whom a Government expedition was lately sent. The Nuers about here seem to raid the Dinkas a good deal, though some of the former on the Zeraf were said to wish to have Faragalla as their chief, probably to escape any possible reprisals that may be made against Diu.

Beyond Khandak the route still led across a flat plain, liable to be flooded when there is a high Nile. Between this and the Zeraf the khors and swamps make the country impracticable, and Captain Liddell was forced to give up the idea of striking for the river on the return journey to meet a launch which he had arranged should

DINKAS AT KHANDAH.

be ready for him. At Luang Deng there was formerly a noted "Kenisa," the sheikh having a great reputation as a holy man; but there are now only a couple of "tukls," in one of which are kept a number of old guns taken by Diu from the Dervishes sent against him from Bor under Emir Elias.

The Dinkas of the districts now reached proved to be much more powerful than those further north, and consequently less afraid of the Nuers. As far as Fataltun, the road traversed an almost continuous series of villages, but beyond this the country was uninhabited, except for a few wandering Dinkas, who were out collecting "alob" (heglik berries). About here the transport animals were much worried, first by a small fly called "rung," afterwards by "serut" flies. Near Pabek there were indications that the inundation had been about 18 inches deep. The place lies on the edge of a swamp which separates it from its "meshra" (landing-place) on the Mading river, which Captain Liddell was anxious to visit, but found it impossible to do so without canoes. He learnt from the chief Gurung that it was here that Mr. Grogan's party was attacked during his journey north through this district, and the people held aloof from fear of reprisals. Enough had, however, been seen of the country to show that it would be unsuitable, owing to its liability to be flooded, for the route of a telegraph line, and Captain Liddell therefore decided to turn back. He found the country drier than on the outward journey, and the route is said to be,

as a rule, used only in the wet season, one near the Zeraf being used in the "seif," or hot weather. The latter was, however, impassable at the time, owing to the exceptionally high flood. From Luang Deng there was formerly a track to the Khor Filus (Sobat system), and the natives talk of re-opening it. All along the road numbers of giraffe were seen, and at some seasons elephants must be numerous. Ostrich, roan antelope, "tiang," etc., were also seen, and in several places there were hippopotamus tracks.

A few weeks later Captain Liddell was back at Shambe, and made another attempt, in company with Sir W. Garstin, to explore the waterways leading from the Nile to the Twi district—this time by "spills" which had been found to run into the Jebel near Shambe, from the Awai river. On May 8 these were entered by a steamer towing a barge and telegraph launch, and the Awai was ascended to the

DINKA GIRLS POUNDING DURRA.

western end of Akwoit island, where were a number of temporary Dinka villages. Further on the channel narrowed, the barge and launch

brushing through the grass. On the following day the steamer stuck near the junction of the Atem and Mading with the Awai, but, proceeding in the launch, the party went down the Mading as far as Gurung's "Meshra." All three rivers swarm with hippopotamus. Afterwards the Awai was explored below the spill into the main river, and was found to lead to a series of lakes reached by Colonel Peake from Shambe during the sudd-cutting operations, the steamer then turning back. Subsequently inquiries were made at Bor as to the channel by which the Dervishers had made their way to Twi, but no such channel could be found. Returning, therefore, to the point of junction of the Awai, Atem, and Mading, the last-named was traced till it became very small, a mile before its final disappearance. Up-stream, on the Atem, firm ground with forest containing fine trees approached close to the east bank, which remains good as far as Tu, the southernmost village of Fakeir, itself the southern district of Twi. The river was said to be blocked by sudd some 10 miles further on. It varies considerably in width and depth, but the least depth found, in the best channel, was 4 feet. The Mading is at first a fine river 80 yards wide, but most of the water soon spills away into the marsh. The Awai is, as a rule, a deep river (9 to 12 feet), but there are shallower parts, and its width varies very much. All along the Awai and Atem there are innumerable "mayas" and spills in and out of the rivers.

The accompanying map is a reduction of Captain Liddell's sketch, which was based on—

(1) A compass sketch from Taufikia to Twi, with halting-places fixed astronomically.

(2) Captain Lyons' survey of the Bahr-el-Jebel.

(3) A compass sketch of the channels between Twi and Shambe adjusted to Captain Lyons' survey.

ON THE ZONAL DISTRIBUTION OF SOUTH ATLANTIC AND ANTARCTIC VEGETATION.*

PRELIMINARY REPORT.

By C. SKOTTSBERG, Botanist of the Swedish Antarctic Expedition, 1901—1903.

ONE of the most important objects for the Swedish Antarctic Expedition was to investigate all biological, and especially zoo- and phyto-geographical, conditions in the southern lands and around their coasts. Fortunately, I had good opportunities of studying the nature of different countries; those in which I have been able to make botanical observations are the Falkland islands, South Georgia, Tierra del Fuego, the Isla de los Estados, the South Shetland islands, and Graham Land, with a number of islets near its coasts.

Here I can only make a preliminary communication as to the phytogeographical results obtained, leaving all details for another paper.

* Map, p. 657.

I. The Land Vegetation.

Which vegetation has the right to be regarded as Antarctic?

Before we had any knowledge that a real vegetable life exists in Antarctic lands, one used to comprehend the floras of the Tierra del Fuego, South Georgia, the Falkland islands, Kerguelen Land, the Auckland group, etc., together with the faint traces of a plant life found in the neighbourhood of Graham Land, under the name of *Flora antarctica*.* But if we have regard to the present geographical definition of the Antarctic zone, we find at once that a great section of the above-mentioned floras cannot with any right claim to be designated Antarctic. The geographical principle, which takes the normal northern extension of drift sea-ice (not icebergs) as the northern limit of the Antarctic region, seems to me rather natural; and Graham Land, with its islands, the South Shetlands, the South Orkneys, and South Georgia, with the South Sandwich islands, though within the Atlantic, have thus to be considered as Antarctic. From my study of the vegetation in some of these regions, I am of opinion that it is not in all cases truly Antarctic, still less so in the case of the Falkland islands or Tierra del Fuego.

It seems to me appropriate, for the lands south of 40–50° S, to propose the following phytogeographical zones: the *Austral* zone, including Tierra del Fuego, with the Isla de los Estados, the Falkland islands, South Georgia, and no doubt also the South Sandwich islands; and the *Antarctic* zone, including South Orkney and South Shetland islands, and Graham Land, with its surrounding groups of islands. The Austral zone is characterized by a climate which permits the existence of forests or grassland; the Antarctic climate giving origin to a cold desert.†

If we survey the vegetation of the Austral regions, we shall find, going from the west to the east, the luxuriant forests of West Fuegia gradually change into the South Georgian grassland, which exists under very hard conditions, and therefore is very poor.

Tierra del Fuego.—Brought by the predominating westerly and south-westerly winds, a very great quantity of rain and snow drenches the south and west Fuegian islands. The following table‡ speaks in the main for itself. As to the great mass of

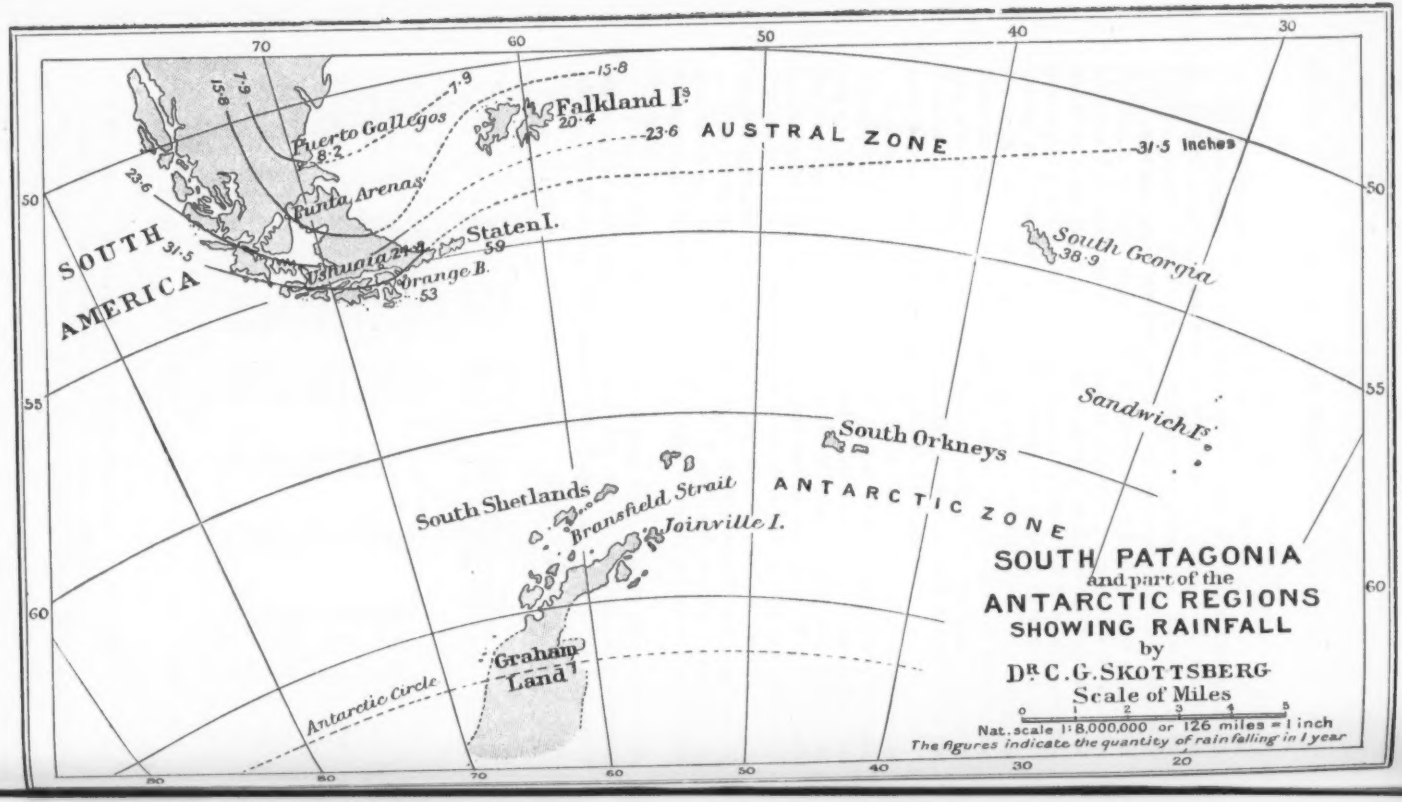
Tierra del Fuego, Orange Bay. Lat. 55° 31′ S., Long. 68° 5′ W. 1882–83.

Month.	Mean temperature. Fahr.	Means of max. temperature. Fahr.	Means of min. temperature. Fahr.	Mean humidity of air. Per cent.	Mean strength of wind. Ft. per sec.	Days with rain or snow.	Days with snow.	Rain and snow. Inches.
	°	°	°					
October ...	42·40	51·42	34·66	83·3	18·0	26	6	3·2
November ...	44·29	53·20	36·59	82·4	24·5	28	3	5·0
December ...	46·22	55·45	38·32	83·0	24·7	29	2	5·9
January ...	46·00	51·35	38·82	83·1	30·1	28	7	6·4
February ...	48·05	60·33	39·79	80·6	25·5	27	2	3·4
March	42·62	51·26	36·91	79·5	21·6	26	4	6·0
April	40·89	46·87	35·17	83·9	19·3	26	4	7·0
May	39·91	44·98	34·88	83·2	19·5	25	9	4·5
June	36·19	40·30	31·37	88·1	18·2	23	9	4·8
July	37·76	42·78	35·54	82·0	19·8	21	11	1·5
August ...	37·45	43·70	32·09	76·1	19·3	25	13	5·4
Year (eleven months)	41·98	49·24	35·83	82·3	21·9	284	70	53·1

* For instance, Drude, 'Atlas der Pflazenverbeitung.' Gotha: 1887.

† Schimper, 'Pflanzengeographie,' p. 177. Jena: 1898.

‡ My information on the Fuegian climate is from 'Mission Scientifique du Cap Horn, 1882–83,' t. ii. Paris: 1885.


70
60
50
40
30
50
55
60
7·9
15·8
Puerto Gallegos
8·2
Falkland Is
20·4
23·6
AUSTRAL ZONE
31·5 Inches
Punta Arenas
SOUTH AMERICA
Staten I.
Ushuaia 24·9
59
Orange B.
53
South Georgia
38·9
Sandwich Is
South Orkneys
South Shetlands
Bransfield Strait
Joinville I.
ANTARCTIC ZONE
Graham Land
Antarctic Circle
SOUTH PATAGONIA
and part of the
ANTARCTIC REGIONS
SHOWING RAINFALL
by
Dr C. G. Skottsberg
Scale of Miles
0 1 2 3 4 5
Nat. scale 1:8,000,000 or 126 miles = 1 inch
The figures indicate the quantity of rainfalling in 1 year

rain and snow, I find it rather remarkable that the number of snowy days is so great. But a glance at the more detailed table shows that the snow very often appears mixed with rain; and that falls of pure snow even at a lower temperature are rare. Thus, it is easy to understand that the snow never lies many hours in the forest, being half melted when falling. The direction of the wind is mostly west-south-west, and the strength very great. The sky is very cloudy, and the humidity of the air great.

These climatological conditions have nourished a typical rain-forest. It consists mainly of a kind of beech, the *Nothofagus betuloides* (Mirb.), Blume, a low tree with small leathery leaves. This, as well as two other trees rather common amongst the beech, *Drimys Winteri* (Forst.) and *Maytenus magellanica* (Lam.), Hook. fil., is evergreen. The *Nothofagus antarctica* (Forst.), Blume, which is deciduous, plays a part only above the limits of the evergreens, the climatological factors allowing it to climb the mountains much higher up than this. The ground vegetation in the forests is very remarkable. It consists of carpets of exceedingly luxuriant *hepaticæ*, of many types and species, while the phanerogamic are rather sparely represented. As a characteristic species, climbing the trunks of the trees, I only mention the *Lebetanthus myrsinites* (Lam.), Endl.

As the map shows, the rainy region makes a curve towards the north-east, including the Isla de los Estados. Here we find the largest quantity of annual rain observed in the regions treated in this paper—not less than 1500 mm.* The main character of the forest is quite the same as in other parts of the rainy zone. Towards the north and east this zone presently passes into a region with much less rain; here Ushuaia, the Fuegian capital, is a station for meteorological observations. I refer to the publications by the 'Mission scientifique du Cap Horn,' and the paper by Dr. Chavanne. Unfortunately, this paper only shows the average temperature and rainfall for the four seasons, and not for the months, nor the specially important averages of the extreme temperatures†; as to the quantity of snow there is no information.

TIERRA DEL FUEGO, USHUAIA. LAT. 54° 49′ 30″ S., LONG. 68° 18′ 8″ W. 1882-3.

Months.	Mean temperature. Fahr.	Means of max. temperature. Fahr.	Means of min. temperature. Fahr.	Mean humidity of air. Per cent.	Mean strength of wind. Ft. per sec.	Days with rain or snow.	Days with snow.	Rain and snow. Inches.
	°	°	°					
December ...	49·57	59·67	38·91	73·4	7·5	14	0	2·5
January ...	49·55	58·87	39·72	75·8	7·5	19	1	2·3
February ...	52·02	64·54	38·57	75·4	8·8	12	1	1·8
March	45·80	58·33	36·55	79·8	6·9	18	0	3·1
April	42·46	50·45	33·10	75·1	6·9	15	5	2·0
May	39·61	48·36	32·57	75·2	7·2	19	3	1·9
June	35·11	41·07	28·60	78·9	4·9	13	5	2·2
July	37·24	45·03	30·13	72·4	6·5	8	5	1·3
August ...	40·01	48·81	31·60	72·0	6·2	9	3	1·4
September ...	39·40	48·95	31·42	75·1	4·9	14	6	2·9
October ...	46·49	54·80	35·74	67·8	6·2	14	0	1·8
November ...	46·18	53·87	37·02	64·5	6·9	15	2	3·1
Year	43·63	52·73	34·50	73·8	6·7	170	31	26·3

* Chavanne, 'Die Temperatur und Regenverhältnisse Argentiniens. Veröff. der Deutschen Akademischen Vereinigung.' Buenos Aires: 1903.

† Schimper, *l.c.*, p. 191.

USHUAIA. OBSERVATIONS DURING TEN YEARS. AFTER CHAVANN.

Season.	Mean temperature. Fahr.	Rain and snow. Inches.
	°	
Spring	43·70	4·02
Summer	50·18	8·50
Autumn	42·80	7·56
Winter	34·70	4·72
Year	42·84	24·80

The tables show distinctly the difference between this climate and that referred to above. But they do not give an exact idea of the snow conditions in this part: one would think that, in the rainy region, we should also get more snow. It would have been a great advantage to have had exact figures of the quantity of snow falling, not only the days with snow. Very likely the quantity is greater in Ushuaia than in Orange bay.

And there is an important difference bearing on the constitution of forests: according to our experience of the winter round Ushuaia (September 16 to November 5, 1902), big masses of snow lie in the forests for weeks. The direction of wind is about the same, but there is a great difference as to strength. The nebulosity and relative humidity of air are less too.

The vegetation completely corresponds to the climate. Here we meet with summer-green forests, in the winter presenting about the same aspect as those in Scandinavia. *Nothofagus antarctica* (Forst.), Blume, prevails, mixed with rare and tiny specimens of *N. betuloides* (Mirb.), Blume, *Maytenus magellanica* (Lam.), Hook. fil., and *Drimys Winteri* (Forst.). Also here *N. betuloides* does not go so high above the sea-level as *N. antarctica* (Forst.), Blume. The bushes in the wood are here, as well as further south, evergreen. The ground in the summer-green forest is destitute of a coherent moss carpet; the open spaces are occupied by meadows; the *hepaticæ* are few in number in comparison with the *musci*.

After passing the ridge of the Cordillera, the wind has parted with most of its humidity, and the climate of eastern Fuegia and Patagonia gets more and more dry. The vegetation gradually becomes rather poor and sterile, only the rivers being surrounded by woods. As an example, I may mention Puerto Gallegos in 51° 39′ S., 69° 13′ W., where meteorological observations have been made during two years.

PATAGONIA, PUERTO GALLEGOS. LAT. 51° 39′ S., LONG. 69° 13′ W. AFTER CHAVANNE.

Season.	Mean temperature of air. Fahr.	Rain and snow. Inches.
	°	
Spring	46·22	1·10
Summer	54·68	1·41
Autumn	45·32	3·42
Winter	35·24	2·28
Year	45·36	8·21

The Falkland Islands.—The south-west winds have to pass a broad space of water on their way to the Falkland islands; and, though we cannot expect the

same quantity of rain as in southern Fuegia, it is not surprising that the rainfall is considerably greater than in the corresponding latitude on the eastern coast of South America. It is true that the quantity of rain is smaller than round Ushuaia, but nevertheless it must be considered as quite sufficient for a summer-green forest; yet on these large islands there does not exist a wild tree—the ground is covered by a boggy grassland.

Schimper * considers the climate of the Falkland islands as warm-temperate—in my opinion without any reason; the tables show that no month reaches an annual medium of 50° Fahr., and therefore the cold-temperate might be a more adequate designation.

As Schimper points out, the climate is especially favourable for the existence of grassland and meadows. But this fact does not account for the complete absence of any arboreous vegetation.

FALKLAND ISLANDS, PORT STANLEY. LAT. 51° 41′ S., LONG. 57° 51′ W. 1875–77.

Zeitschrift d. oesterr. Gesellsch. f. Meteorologie, B. xvi. (Wien, 1881).

Month.	Mean temperature. Fahr.	Means of max. temperature. Fahr.	Means of min. temperature. Fahr.	Mean humidity of air. Per cent.	Days with rain or snow.	Rain and snow. Inches.
	°	°	°			
December	46·76	53·06	40·46	76	21·0	2·0
January	49·64	56·12	43·16	72	21·3	2·7
February	48·56	55·04	42·08	76	19·3	2·2
March	48·56	54·32	42·80	81	18·3	1·7
April	43·88	49·10	37·40	84	22·3	2·1
May	40·28	44·60	35·96	90	19·3	1·7
June	37·94	41·54	34·16	91	20·0	1·5
July	36·50	40·64	32·36	91	20·3	1·8
August	37·58	42·08	33·08	88	22·0	1·2
September	39·92	45·14	34·70	81	15·7	1·1
October	41·00	46·40	35·60	82	21·3	1·3
November	44·78	50·54	39·02	76	15·3	1·1
Year	42·94	48·21	37·57	82	236·1	20·4

Without doubt, the rain is sufficient for a summer-green forest, but it is too uniformly distributed over the twelve months. And, what the table does not tell, the ground is deprived of a cover of snow; we cannot take into account the more or less extensive but always thin patches which sometimes cover the ground, especially the slopes of the mountains, for a week or so.† This want of snow in the winter and spring, combined with an exceedingly strong wind from the south-west, blowing day after day at relative low temperatures, has, I dare say, influenced the characters of the Falkland vegetation. Large areas of the ground consist of peat. Nowhere, especially on the eastern island, is there any shelter from the wind.

If we look at the distribution of rain in the four seasons, we shall find that winter and spring show the smallest quantities. It is of interest that the wind at that time of the year blows more from the west and north-west; summer and autumn, with south-west and south wind, are richer in rain. Calm days are more

* *L.c.*, p. 481.

† The winter—July, August, 1902—we stayed there was considered the strongest for at least fifteen years.

common in the winter, but always rare. The winter temperature is not very low, seldom lower than some degrees below freezing, but always, together with the heavy gales, very dangerous for trees, which are not then able to recover the moisture lost by transpiration.

South Georgia.—We might expect South Georgia to receive a great quantity of rain or snow from the winds of the ocean, and the observations made hitherto confirm this. On the contrary to the case of the Falkland islands, we here meet with a high land covered with ice, which sends glaciers down to the fiords. In spite of that, the general aspect of the island is not quite Antarctic, owing to the large areas of lowland with vegetation.

South Georgia, Royal Bay, Lat. 54° 31′ S., Long. 36° W. German Station, 1882–83.

Month.	Mean temperature. Fahr.	Means of max. temperature. Fahr.	Means of min. temperature. Fahr.	Mean humidity of air. Per cent.	Mean strength of wind. Ft. per sec.	Days with rain or snow.	Days with snow.	Rain and snow. Inches.
	°	°	°					
September ...	30·38	35·60	25·34	—	25·3	10	9	5·0
October ...	34·34	39·20	29·66	—	21·6	26	21	4·6
November ...	37·22	41·90	32·54	76·2	17·1	29	19	2·8
December ...	38·66	43·70	34·34	73·9	23·6	30	19	2·9
January ...	40·28	44·96	35·96	71·9	20·7	28	15	3·2
February ...	41·72	46·58	36·32	70·9	23·0	23	13	3·4
March ...	38·30	42·98	34·34	72·6	22·0	26	16	5·8
April ...	32·90	37·40	29·12	77·3	22·6	25	23	3·2
May	31·64	35·96	26·78	—	21·0	27	25	0·6
June ...	26·78	31·10	22·64	75·9	18·7	25	23	2·1
July	27·86	32·18	22·64	72·6	23·3	25	21	1·4
August ...	34·16	39·38	28·76	72·3	27·6	27	18	3·9
Year ...	34·52	39·25	29·87	—	22·2	301	22·2	38·9

The large mass of rain and snow is not very equably distributed; especially remarkable are the months of March and May. The winter is comparatively dry, but as a rule only snow falls and covers the country with a thick layer.* The spring has the greatest quantity of rain or snow. The hydro-meteorological conditions thus do not put any obstacle in the way of an arboracious, even an evergreen, vegetation; but still there is neither tree nor bush. Certainly there is not much lowland to bear a forest, but there is enough. The other climatological factors explain the condition. We have to do with very low summer temperatures, not seldom below freezing, and with gales of great strength, which suddenly with impetuosity break down from the glaciers over the completely exposed ground.

The paucity in phanerogamic species seems to me inexplicable. The few that exist are, as far as we now know, identical with Fuegian and Falklandian plants, and surely more species of those floras should be able to endure the South Georgian climate. The problem gets more difficult still when we think of the numerous cryptogamic species, amongst which a great percentage is endemic. The story of the geographical development and the former large extension of the inland ice will perhaps give an answer to the question.

As I stated already in the beginning of this paper, geographers regard South

* Skottsberg, 'The Geographical Distribution of Vegetation in South Georgia,' *Geographical Journal*, November, 1902 (London: 1902).

Georgia as a real Antarctic land; I also said that this, from a botanical (phytogeographical) point of view, is not my opinion. The vegetation is nearly related to that of the Falkland islands; the lowland is covered by the Austral steppe, and the tussock grass *Poa cæspitosa* (Forst.), Hook. fil., plays the same part as once in the Falkland islands. An important difference between the two floras is that *Empetrum rubrum*, Vahl., one of the most characteristic Falkland plants, does not grow in South Georgia. When my collections are determined, I hope that we shall be a little better informed on the phytogeographical position of that island. Very likely some of the endemic mosses will prove to be identical with others described from other South Atlantic lands.

The *South Sandwich Islands* have never been visited by scientists, and we know nothing about their phytogeographical position. But I conclude that they are nearly related to South Georgia, though perhaps still poorer; their vegetable life perhaps forms a still more apparent transition to the Antarctic.

The Antarctic Zone.—The Antarctic lands, here referred to, are—Graham Land with its subdivisions * (King Oscar II. Land, Palmer Land, Louis Philippe Land, Danco Land) and surrounding groups of islands (Dirk Gherritz Archipelago, Trinity island, Joinville, and Dundee islands, etc.), and the South Shetland islands, the Elephant islands and the South Orkney islands.

The Antarctic zone may be called a cold-desert zone. The climate does not admit the existence of a close vegetation of forest or even grass, not because of an especially low winter temperature, but because the summer is very cold, the ground being frozen almost all the year; further, the wind is really formidable. On the coasts of the main land we cannot hope to make richer finds, because of the inland ice, that covers the land down to the sea-level, steep rocks being very often the only spots of bare ground. But all the small islets are free from ice, and, in summer, from snow too, and there we have to look for the richest Antarctic flora. I have not seen very much of the South Shetlands, but in one location (Harmony Cove, Nelson Island) I made acquaintance with one of the most dense and fine-looking moss carpets I ever saw down there. The islets at the west coast of Louis Philippe Land and in the Gerlache Strait are also in possession of a relatively rich flora, but here

SNOW HILL ISLAND. LAT. 64° 24′ S., LONG. 57° 6′ W. 1902-03.

Month.	Mean temperature. Fahr.	Means of max. temperature. Fahr.	Means of min. temperature. Fahr.	Mean strength of wind. Ft. per sec.	Days with snow or rain.
	°	°	°		
March	13·28	18·50	7·88	36·15	29
April	7·16	15·08	−0·22	24·93	25
May	−0·76	7·70	−8·68	28·22	27
June	−3·46	1·22	−16·96	28·22	21
July	−5·62	3·38	−13·90	31·17	27
August	−2·92	8·78	−13·00	28·87	20
September	3·74	12·20	−4·18	25·59	20
October	15·08	23·00	6·80	24·93	23
November	17·42	21·74	12·92	24·61	26
December	28·40	32·90	23·36	13·20	15
January	30·38	34·16	27·14	19·69	22
February	25·70	33·80	20·84	22·97	22
Year	10·70	17·70	3·50	25·76	277

* In "Antarctic" (Stockholm, 1904) Mr. Nordenskjöld has proposed the name "West Antarctic" for these parts of the south polar lands.

of course, as in all Antarctic lands, the phanerogamic plants play no part in the general aspect presented by the vegetation; it is not many places where the only Antarctic phanerogamic, *Deschampsia antarctica*, Hook., is found, and very sparely indeed. And, generally, the mosses and lichens do not form a compact, close carpet, but grow in small tufts in the fissures or between the stones.

The penguins are perhaps one of the most inimical influences of Antarctic plants. On many places where the Antarctic flora might have attained a rich development, we find the ground completely covered by penguin rookeries, not leaving as much as a square inch free from guano. A striking example of the influence of the penguin rookeries is Paulet island. There all the level ground, all the slopes, when not too steep, are quite covered with penguins. The vegetation has been forced to withdraw to the upper plateaus round the top of the island. That leads me to think of a statement, made without any reason, that the vertical limit of Antarctic vegetation is to be drawn at 100 feet above the sea-level.* On the top of Paulet island, at a height of 1200 feet, we still find spots of mosses and lichens encrusting the stones.

As to the relations between Antarctic plants and other plants of the world, we know very little. The musci collected by Mr. Racovitza during the Belgian expedition were twenty-seven, of which fifteen were new species.† The others are more or less identical with species found on the northern hemisphere; some exist in the Magellan territories too. One species is found only in South Georgia and in the Antarctic. The hepaticæ, three kinds, are remarkable because two of them were described from South Georgia before.‡

For many years there has been a special interest in the question of bipolarity. A superficial glance at my Antarctic collections shows great concordance with northern and arctic plants, but it has to be proved that we have to do with real bipolar or merely with cosmopolitan species.

YEARLY MEAN TEMPERATURE AND RAIN (SNOW, HAIL, ETC.).

	Temperature. Fahr.	Rainfall. Inches.
	°	
Tierra del Fuego, Orange bay ...	41·99	53·50
Isla de los Estados	42·30	59·10
Tierra del Fuego, Ushuaia	43·63	26·38
Patagonia, Puerto Gallegos	45·37	8·23
Falkland Islands	42·98	20·36
South Georgia	34·52	38·89

II. THE VEGETATION OF THE OCEAN.

As to the flora of the South Atlantic ocean, also here we, in my opinion, find the same limit between Austral and Antarctic vegetation.

The *Austral flora* is characterized by the existence of types of algæ with, in one way or another, floating fronds. *Macrocystis pyrifera* (Turn.), Ag., and *Durvillea utilis*, Bory., are the most representative Austral algæ. The *Macrocystis* surrounds

* A. Ohlin, "Om antarktiska färder och Antarktis," *Ymer*. Stockholm: 1898.
† Y. Cardot, 'Mousses' ('Résultats du voyage de S.Y. *Belgia*,' Anvers, 1903).
‡ F. Stephani, 'Hépatiques' ('Résultats du voyage de S.Y. *Belgia*,' Anvers, 1903).

the coasts of Tierra del Fuego, the Falkland islands, and South Georgia.* It would be interesting to know if it also lives round the South Sandwich islands. I do not know if the Scottish South Polar Expedition has found the *Macrocystis* in the South Orkneys, but I should think not.† Other characteristic algæ are the Lessonias.

The *Antarctic vegetation* is characterized by the total absence of a type with floating fronds (except the *Marginaria jaquinoti* (Mont.), floating when torn off from the bottom). Such a type would be quite inconsistent with the ice-conditions. The vegetation of the beach is influenced in its character by the ice-floes always grinding against the stones, and has been forced to retire into the small basins, where the ice-floes cannot come. Giant algæ are not at all wanting, especially the *Desmarestiæ*, but in a greater depth. Here, as in more northern shores, calcareous algæ form an important part of the vegetation.

The extension of the Austral and Antarctic zones into the Indian and Pacific oceans has not been referred to here. As botanically Antarctic lands we perhaps ought to consider Enderby and Kemp Land, the different parts of Wilkes Land, Victoria Land with Balleny islands, and Alexander Land with the Biscoe islands. Austral lands are Bouvet island, Prince Edward and Crozet islands, Kerguelen, MacDonald and Heard islands, New Zealand and Antipode, Chatham, Auckland, Campbell, Macquarie, and Emerald islands.

The northern limit of Austral vegetation seems to me difficult to define. I think that the 40° S., of course with some deviations to the north or south, more or less limits it. To this question, as well as to the circumpolar extension of Austral vegetation, I shall return another time.

GRUEBER AND DORVILLE'S JOURNEY ACROSS TIBET.

To the Berlin *Zeitschrift der Gesellschaft für Erdkunde* for 1904, No. 5, Herr R. Tronnier contributes a monograph on the journey made in 1661 across Tibet by the Jesuits, Johannes Grueber and Albert de Dorville. Subjoined is a summary of the results.

The object of the present study is to vindicate for the German, Johannes Grueber, the place to which he seems entitled in the history of geographical progress, but which has certainly not hitherto been conceded to him. He is certainly not the first European that crossed Tibet, as Odorico de Pordenone's journey shortly before 1330 can scarcely be called in doubt. But he is the first who brought back with him a genuine record of the land and its people. Although a Jesuit, he did not go to Lhasa as a missionary like his precursor and his immediate successors; he went on a real geographical mission, imposed by the necessity of finding a new home route to Europe, a route which at the time was supposed to be still untrodden.

Authentic documents referring to the journey are not very numerous. They comprise five of Grueber's letters, a Latin report of the Jesuit, Athanasius Kircher, and lastly a long Italian "Relazione" by an uncertain author. The chief difficulty in reconstructing the journey lies in the fact that these scanty materials present great discrepancies, to reconcile which, where at all possible, is the purpose of this essay.

Grueber's Letters.—I. The earliest extant, dated from Surat (India), March 7,

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* Skottsberg, "Några ord om Macrocystis pyrifera," *Bot. Notiser*, 1903, No. 2.

† Since this was written, I learn that the Scottish Expedition has reported three mosses, six lichens, and some algæ from the South Orkneys, but *not Macrocystis*.

1658, is written in German, and addressed to the Rev. Father John Haffenecker, rector of the Jesuits' College and University of Graetz in Styria.

II. The second, which, like all the rest, is in Latin, follows a now lost short communication to the same address, and is undated, but was sent to P. Joannes Gamans, S.J., in Aschaffenburg from Rome shortly before starting on his second journey, hence apparently about the beginning of 1664. It is by far the most important of all his letters on his journey through Tibet.

III. is dated May 10, 1664, from Venice to Kircher, after starting on his second journey. It contains a copy of another undated letter from P. Ferdinand Verbiest, which Grueber had received in Singanfu after his departure from Pekin (1661).

IV. and V. are replies to a distinguished acquaintance of unknown name and address, on all kind of things connected with the journey. IV. was written in Danzig on December 11, 1664; V. in Breslau on March 14, 1668.

As far as known, Letter I. occurs first in the collection 'Der Neue Welt-Bott' (Augsburg and Graetz, 1726), No. 34; II., IV., V. in Thévenot's 'Divers Voyages Curieux,' but apparently not in all editions. III. is found in Kircher's 'China Illustrata' (Amsterdam, 1667), pp. 222 *sq.*

'Illustrata,' pars. ii., cap. iii. § 2, and cap. iv. (pp. 64–77). Here is also given a "Carta Geodoborica," a route-map, which, however, presents a very confused picture of the line of march.

The Italian Relazione.—The origin of this document will be explained in our biographical notice, and here it will suffice to give the main result. Grueber's interview with the two Italians took place in Florence on January 30, 1666 (New Style). It is scarcely surprising that errors should occur in a narrative written down after a conversation of several hours' duration; hence it can only be accepted with a certain reserve.

The Relazione was first printed by Thévenot (*op. cit.*) as the 'Viaggio del P. Giovanni Grueber tornando per terra da China in Europa.'

For the lives of both travellers two documents have been brought to light, which, though short, are authentic. (1) Ph. Couplet, 'Catalogus Patrum Soc. Jes.' (1686), where reference is made to both under Nos. 74 (p. 39) and 81 (p. 43); (2) On Grueber alone valuable information is supplied by Carlos Sommervogel in 'Bibliothèque de la Compagnie de Jésus' (Première Partie: "Bibliographie"), (Brussels, Paris, 1892, vol. iii.).

Albert de Dorville (*ob.* 1662).—This is undoubtedly his correct name, although called Alb. de Bonville by Grueber in his Letter II. It occurs at least seven times in Kircher's 'China Illustrata,' and also in the 'Catalogus.' He was born in Belgium (date of birth unknown), and went in 1657 to China, where he laboured as a missionary in Shansi. Grueber mentions him (Letter II.) as former associate of P. Martinus Martini, procurator of the order in China and editor of the 'Novus Atlas Sinensis' (1655). In 1661 he was sent back to Europe with Grueber, but next year succumbed to the hardships of the journey in Agra.

Johannes Grueber (1623–1684).—This is the generally current form, though the 'Catalogus' write Greuber (for Grüber?), while the Latin is Gruberus. He was an Austrian-German, born at Linz, on the Danube, October 28, 1623, and received into the order October 13, 1641; went to China as a missionary in 1656, the route followed being from Rome through Asia Minor, Armenia, Persia, and Ormuz to Surat, where he stayed at least ten months, and in December, 1657, observed a lunar eclipse with a view to fixing a longitude (Letter III.). According to Letter I., he intended in a few days (counting from March 7, 1658) to sail in an English vessel for Macao, but, owing to local troubles, did not reach China till 1659.

From Macao Grueber was summoned as mathematical assistant to the court of

Pekin, where he held this position for two years (1659–1661). After the death (February, 1661) of the emperor Shunchi, first of the Manchu dynasty, Grueber was recalled "to receive instructions from the General of the Order at Rome" (Markham), de Dorville being chosen to accompany him on the return journey. As Macao was just then being blockaded by the Dutch, the two Jesuits were instructed to discover, if possible, some shorter overland route to Europe, such as was supposed at that time to have never yet been opened. The travellers now left Pekin for Singanfu and Siningfu, whence they made their way through Lhasa to Agra. Here Grueber lost his fellow-traveller (see above), but continued the homeward journey with Henricus Roth, who had been stationed for nine years in Delhi. According to the Relazione, he went from Agra in seven days to Teli (Delhi), thence in fourteen days to Lahore, and thence to Multan, where he embarked, and in forty days reached Tata at the head of the Indus delta, where he met many English and Dutch traders. After a short delay, he continued the journey by land through Maccaran (Mekran) and Cape Caramania (Kirman) to Cape Jax (Jask) and Ormuz. From Ormuz he again followed the main highway to Smyrna, where he took ship for Messina and Rome. Here he handed his memoranda to Kircher for publication, on the condition that everything was to be included in one volume.

Soon after Grueber was ordered to return to China, and on May 10, 1664, he was already in Venice (Letter III.), evidently on his way to Vienna, as this time he was to take the overland route through Russia to China. After writing Letter IV. (December 11, 1664) at Danzig, he went to Mitau, near Riga, the court of the Duke of Courland, who informed him that news had just come in from the Grand Duke of Moscow that the road to Astrakhan was blocked by the Tatars, at that time allies of Poland against Russia (Letter V.). Grueber had therefore to give up his project, and returned through Breslau to Vienna, whence he accompanied the emperor's envoy, Count Lesle (Lesly) to Constantinople, with the intention of again striking the old overland route eastwards. But here he suddenly fell ill, and, being unable to continue his journey, returned by sea to Leghorn for Florence. Here he had a long interview with Carlo Dati and the author of the Italian Relazione on January 30, 1666, New Style, which answers within a day to the "31 Gennajo 1665 al Incarnatione," the date borne by this document.

Little more is known of the life of Grueber. At the time of the interview he was still under orders to return to China, but does not appear to have done so. Markham states that "Grueber died in 1665 on his way back to China," that is, 1665 Old Style = 1666, as above seen. But even so this date cannot be accepted, and credence must be given to the statement of the 'Catalogus' that Grueber died in 1684, not on his way East, but in Germany.

Across Tibet.

From Pekin to Sining.—Our travellers left Pekin on April 13, 1661, as stated by Grueber in Letter II.: "Discessi è Sinis Pequino 13 Aprilis 1661." Kircher writes in his barbarous Latin, "Ex Pequino itaque hi Patres anno 1661, mense Junio, in Siganfu triginta dierum et hinc Sining sive Sininfu, totidem fere dierum decursu transacto bis croceo flumine, quod Hoang vocant, transito, confecerunt iter." Hence Astley's "he left Peking in the month of June," referring "mense Junio" to "ex Pequino" instead of to "confecerunt iter." All agree that Singan was reached in thirty days, and Sining in another thirty days, so that the section of the journey in China proper took altogether two months. In Singan they probably stopped a few days, since here Grueber received the above-mentioned letter from P. Verbiest, which, as shown by the contents, was written at the earliest four or five days after the travellers had left Pekin; cf. also the address:

"Ad Gruberum in Singanfu *commorantem*." In Sining, again, they must have waited some time for a suitable caravan; hence the somewhat full description of this important mart and its surroundings, with the determination of its latitude, although the reference to the Great Wall is not very clear. According to Peschel and Markham, the stay in both cities should be estimated altogether at one month. For the whole journey from Pekin to Lhasa they allow six months, of which two, as seen, from Pekin to Sining, and three, as we shall see, from Sining to Lhasa, leaving one for the delays in China proper. But this six months is nowhere clearly given, and unless it be a simple error it may have been arrived at on the following calculation. Kircher gives, as the duration of the whole journey from Pekin to Agra, fourteen months; and Grueber (Letter III.) eleven months "after leaving China." Thus the Chinese section would be 14 – 11 = 3 months, that is, the two *en route* and the one of detention, as above.

From Sining to Lhasa.—With Sining begins the most interesting, but at the same time, for us, the least-known section of the journey. From this place to Lhasa there are two main routes. One, the "old" highway, as it is called on Sven Hedin's large map (*Petermanns Mitt. Supplement*, 131, 1900), leads from Sining south-westwards straight to the large lacustrine sources of the Hoang-ho, crosses the Di-chu at Tatsando, and south of the Tanla range joins the other route. This second road runs from Sining west to the Kuku-Nor, skirts it north and south, crosses the south Kuku-Nor range, and traverses the Tsaidam plain to Dsun-Sassak. Here it ramifies, one branch immediately surmounting the ranges in a south-west direction, the other trending first westwards along their foot, and then bending southwards. At the confluence of the Napchitai-ulan-muren with the Murussu (Di-chu) the east branch again ramifies; one line, crossing the headwaters of the river, amongst them the Toktonai-ulan-muren, joins the west route, while the other at once crosses the Murussu and continues to run east of the river. Both branches again unite south of the Tanla range, and then follow the same track as the first route all the way to Lhasa.

In order the better to understand which of these routes was actually taken, here are juxtaposed the pertinent passages from the extant documents—

Grueber (Letter II.).[1]	Kircher ("China Illustrata").	The Ital. Relazione.
". . . Inde (Sining) egressus transivi trium mensium spatio Tartariam adeo desertam . . . Tertio mense attigimus regnum Baranateka. . . ."	P. 65.—"A Sining trimestri spatio per Kalmack Tartariæ desertam, usque ad initium Regni Lassa quod et Barantola Tartari vocant, pervenerunt. . . . P. 67.—Egressi itaque hanc stupendi muri vastitatem dicti Patres, statim rivum piscibus refertum obviam invenerunt . . . transito quoque flumine croceo (Hoang) extra muros, statim vastissimum illud desertum Kalmack . . . ingressi, ad Barantolæ Regnum usque trimestri spatio confecerunt. . . ."	P. 2.—"Essendo egli di China entrato nelle arene della Tartaria deserta, e quella attraversata in tre giorni arrivatò alle spiagge di Kokónor. Questo è un mare simile al Caspio di donde ha l'origine il fiume Giallo . . . Kokonor dunque significa in lingua Tartara Mar grande, dalle rive del quale successivamente discostandosi il Padre entrò in terra Toktokai . . . Per questa terra passa il fiume Toktokai da cui prende il nome; bellissimo fiume e sull' andare del Danubio, se non che ha pochissimo fondo, e un' uomo a cavallo lo passa francamente a guado. . . . Quindi inoltratosi nel paese di Tangut arrivò in Retink, provincia assai popolata del Regno di Barantola, e finalmente nel Regno detto propriamente Barantola. . . ."

A comparison of these records shows clearly that the section between Sining and Lhasa took about three months. This of itself may be important when taken in connection with the following passage from P. Desideri (Lhasa, 1716–22), which occurs in the *Nouveau Journal Asiatique* (Paris, 1831), vol. viii. p. 130: "De Lhasa à Sining il y a deux routes. L'une, de 4 mois, passe par des pays inhabités; l'autre par le désert, n'est que de 3 mois; elle est plus à l'ouest et au nord, et coupe le désert en droiture." This, of course, cannot be taken absolutely, since the caravans move at very different rates of speed. Still, the statement gives us a first safe standpoint. But Grueber says too little, while Kircher tells us that just beyond the "wall" they came upon a river abounding in fish, and also beyond the "wall" crossed the Hoang to enter the "Kalmack desert" (?), statements which are duly entered on his hopelessly confused "route-map," but must remain unintelligible to us. The alleged second crossing of the Hoang-ho can fit in with the "old" route only by taking "extra muros" in a very wide sense, and placing the crossing somewhere between the Oring and the Charing-nor. But this would again be scarcely admissible, since the "Kalmack desert" is not entered till after that crossing.

In the much fuller Relazione, the travellers, after leaving China, traversed the Tartar desert to the Kuku-nor in three days. Then they reached Barantola (Lhasa) through the Toktokai district and the province of Retink, the Relazione here giving relatively ample descriptions, for instance, of the Kuku-nor and of the Koktokai river. Why did Grueber and his editor Kircher pass these things over in silence? But, as such details cannot have dropped from the clouds, we must still assume that they were obtained by the author of the Relazione from Grueber. Only then three points will have to be rectified: (1) Kuku-nor does not mean the "Great," but the "Blue," lake; (2) it cannot be compared with the Caspian, which is about a hundred times larger; (3) nor is it the source of the "Fiume Giallo" (Hoang-ho). Although these statements are wrong, they still show that Grueber was aware that the river trended a long way to the west from Lanchau. Nor will any one infer anything in favour of the "old" route from his statement regarding a "lacustrine source" of the Hoang-ho. On the other hand, it may presumably be inferred that Grueber skirted the Kuku-nor, not on the south side, where, according to Stieler's latest map, the main highway runs, but on the north side, and had thus no opportunity of correcting his mistake regarding the Hoang-ho. And Prjevalski tells that caravans even still take the north side of the lake (*Petermanns Mitt.*, 1876, p. 167).

All this points to the western as the more probable route, and it may even be inferred that the "old" road was already at that time little used. Our travellers' itinerary would thus coincide here with that of Huc and Gabet (1845–46), who also followed the north side of Kuku-nor. Then the further section as far as Dsun-sassak can be anticipated, and, indeed, is laid down on the maps. But at Dsun-sassak fresh difficulties arise, as here begins the above-mentioned forking.

According to the Relazione—the other records are silent—the travellers now entered the Toktokai district, supposed to be so named from the Toktokai river. Where is this district to be sought? Markham and von Richthofen point out that one of the headwaters or left tributaries of the upper Yangtse (Murussu) is the Toktonai-ulan-muren, which might perhaps be brought into this connection. It was above seen that this river is crossed by one caravan route west of the Murussu. But, however tempting the conjecture, it cannot be accepted. According to Prjevalski (quoted by St. Martin *s.v.* Yangtse), the Toktonai-ulan-muren is only 20 to 30 metres wide at its junction with the Murussu, which is here 60 to 80 metres wide, but fordable. On the other hand, Grueber's Toktokai is spoken of as a very

fine river, broad as the Danube, although (at that season) easily fordable on horseback. Von Richthofen rightly assumes that the breadth here meant is that of the Danube at Linz, Grueber's birthplace, where the bridge is about 200 metres long—that is, ten times that of the Toktonai. Nor does one quite see why a large province should be called after a small river, or why Grueber should not have mentioned the more northerly and much more important Napchitai-ulan-muren, or the central mainstream (Murussu) itself. That this last was really meant seems almost certain from these and further considerations. The pundit A. K. once gives the alternative name "Thokto" to the upper Murussu (*Petermanns Mitt.*, 1885, plate i.), while Grueber's statement as to the breadth of the river agrees remarkably well with that given by Prjevalski for the Murussu (Di-chu) at the Napchitai-ulan-muren confluence—that is, just where it is crossed by the main easterly track (the 1873 journey). At this point Sven Hedin's map (see above) describes it thus: Main branch 214 metres, breadth of the river-bed (of course, at summer high water) about 1600 metres. But as the stream was easily fordable on horseback, and its breadth was that of Prjevalski's smaller figure, it follows that our travellers reached the river at a time when the summer high water (June to July) was already over, while in any case its great breadth did not permit of any great depth.

Equally strong reasons for the westerly track it would be impossible to adduce from the scanty extant records. The very rough passes over the Burkhanbudda, Shuga, and Bayan-Khara-ula ranges, leading to where the Murussu was certainly forded (see above), could just as well have been surmounted by our travellers as they were later by Huc and Gabet and Prjevalski. Beyond the Murussu, where, owing to the severe climate, the caravans begin to break up into small scattered groups, the wayfarer traverses the broad plateau about midway between the river and the "old" route, and thus gains the Tanla range, and beyond it the converging point (Nap-chu) of all the roads leading south.

The Relazione brings the travellers from the Toktokai district through Tangut to the thickly peopled province of Retink. The term "Tangut" is usually restricted to the Kuku-nor region; that is, the north-east corner of Tibet. Hence Markham supposes that in this instance it has been extended to the tableland north of Lhasa. Kircher even applies the name to the whole of east Tibet, Barantola included. Perhaps it might be equally correct simply to reverse the sequence of the two names Toktokai and Tangut.

In Lhasa.—For the capital of Tibet, Grueber uses both the native name Lhasa and the Tatar (Mongol) Barantola. As this was the terminus of the caravan with which they had hitherto travelled, they had now to look round for another destined for India. It is not quite clear how long this took them, as Grueber speaks only of a month ("in hac civitate sumus morati uno mense," Letter II.), while Kircher and Markham give them two months. Perhaps the *one* and the *two* are to be taken as round numbers.

Grueber utilized the delay to fix the latitude of Lhasa, and take sketches of the natives, the temples, and the "Burg Bietala" (Kircher, 74), residence of the Dalai Lama [Pota-la].

From Lhasa to Agra.—Four days out from Lhasa our travellers reached the very high "Langur" range, which Kircher wrongly connects with the Paropamisus of the ancients, and with Marco Polo's Bolar. Crossing this terrible range, where they could hardly breathe from the rarefied atmosphere, and were in constant danger of being poisoned by the effluvia of certain plants, they still took nearly a month to reach Cut(h)i, the first city in "Necbal" (Nepal). In Stieler's old atlas the name "Langur" certainly occurs, only the range is placed too far from

Lhasa to be reached in four days. The pundit of 1867 tells us (*Petermanns Mitt.*, 1875, 150) that the people of Nepal call all snowy peaks Langur, and it is evident from all the circumstances that here Langur simply means the Himalayas. They therefore followed the great highway, which leads from Katmandu to Shigatse, on the upper Brahmaputra (Sanpo), and has often been described. From Kuti they went by one of the most difficult roads in the world (Markham) to Nesti in five days, and thence in six days to the double capital of Nepal, Katmandu-Pattan. Here they had a friendly welcome from the king, whom Grueber greatly astonished with the wonders of a little telescope which he gave him.

From Nepal five days (Kircher) took them to Hedonda, a station of the Moranga state, which state they traversed in five days, meeting no towns, but only straw huts and a royal custom-house. From Hedonda Kircher brings them in eight days to Mutgari (Markham's Motihari), the first city of the Moghul, and thence in ten days to Battana (Patna), on the Ganges, crossing the river at Minapor (Markham's Dinapur). Thence eight days brought them to Benares, eleven to Ca(ta)mpur, and seven to Agra, where de Dorville died (see above). This place was reached about the middle of March, 1662, and as the start was made on April 13, 1661 (see above), the whole journey between Pekin and Agra lasted just about eleven months, as stated by Grueber in Letter II.

Astronomic Observations.—Of special interest to geographers, are the somewhat numerous determinations of latitude which were made by Grueber *en route*. Although pretty accurate, it will be seen, from the comparative figures given below, that all his determinations, owing perhaps to defective instruments, are too low by from 24′ to 53′, or say, roughly, by a mean of half a degree.

Place.	Latitude (Grueber).	Later determinations.
Sining	36° 10′	36° 39′ 20″ (Jesuits, 1708–9?). 36° 33′ 32″ (St. Martin; Easton, 1880). 36° 37′ 15″ (Potanin, 1884–6).
Lhasa	29° 6′	29° 39′ 17″ (Pundit; St. Martin).
Katmandu	27° 5′	27° 41′ 28″ (Pundit). 27° 36′ (St. Martin).
Hedonda	26° 36′	27° 26′ (Pundit).
Patna	24° 44′	25° 35′ (Indian Survey). 25° 37′ 15″ (St. Martin).
Benares	24° 50′	25° 17′. 25° 18′ 33″ (Observatory).

Here follow the latitude and longitude (E. of Rome), partly calculated by P. Henricus Busaeus from Letter III. before Grueber's own observations.

Place.	Latitude.	Long. E. of Rome.	Long. E. of Paris (St. Martin).
Agra	26° 43′	—	75° 41′ 29″
Delhi	28° 39′	$4^h\ 16^m\ 16^s = 64°\ 4′$	74° 52′ 8″
Surat	21° 10′	Lost.	—

According to Grueber-Busaeus, the longitude east of Greenwich would be for Agra 76° 34′, instead of 78° 2′ (St. Martin); for Delhi, 76° 54′, instead of 77° 12′ (St. Martin). All these data, published but not utilized by Kircher, were studied by later European cartographers, amongst others, G. de l'Isle and Nolin for their maps of Asia (Paris, 1700 and 1704).

On other materials supplied by Grueber, Astley wrote about 1745, "With regard to the Chinese and Tarters, Grueber has explained some things more fully than other authors have done, as well as related others in a different manner." His ethnological descriptions and sketches of Tartars (Mongols) and Tibetans agree fairly well with those of K. Futterer and other recent observers. His actual wanderings may be roughly estimated at a total length of some 25,000 miles, or about the circumference of the globe.

VAN DER GRINTEN'S PROJECTION.

By E. A. REEVES.

THERE can be no doubt that for certain purposes it is an advantage to represent the whole surface of the Earth on one plane instead of by two hemispheres. The geographical distribution of population, oceanic circulation, isothermal and isobaric lines, and other natural phenomena, can, as a rule, be much better shown on some such projection; and certainly steamer tracks, telegraph cables, etc., can be followed far more readily when laid down upon a map of the whole Earth than when shown on a projection that necessitates the breaking up of the lines into sections. The drawback to all such projections, however, is the necessary great distortion, either in the area or configuration of the land, in high latitudes. The two projections of this kind which are most familiar, and which can be seen in many atlases, are the well-known Mercator's projection, and the Elliptical Equivalent projection invented by Prof. C. B. Mollweide in 1805. Whilst the former is admirably adapted for marine charts, its enormous exaggeration of the land areas in high latitudes renders it unsuited for most other purposes. In this the angles of intersection between the parallels and meridians, and the general configuration of the land, are preserved at the expense of greatly exaggerated areas and distances as the equator is left. To obviate these defects Prof. Mollweide drew his elliptical projection; but in preserving the correct relation between the areas he was compelled to sacrifice configuration and angular measurement, as will be seen by a glance at Fig. 4.

A projection has recently been constructed and patented by Mr. Alphons J. van der Grinten, of Chicago, of which the object is to strike a mean between the projections of Mercator and Mollweide, and a full description of this is given in *Petermanns Geographische Mitteilungen* for July last. Figs. 1 and 2 give a general idea of this projection and its construction. The parallels of latitude and meridians are contained in a circle, or marginal meridian, the area of which is equal to the surface of a globe of half the diameter. The straight line representing the equator, instead of being divided into 180°, as in ordinary circular projections, is divided into 360°, so as to include the whole equatorial circumference of the Earth; thus, instead of there being 90° on either side of the central meridian, there are 180°. In order to obtain the average general distribution of errors of area and angle to the best advantage, the parallels of latitude increase rapidly soon after leaving the equator, and the points where each of these intersects the central meridian and that forming the circumference of the map or plane of projection is obtained by the formulæ—

$$d = \frac{\sqrt{1+c} - \sqrt{1-c}}{\sqrt{1+c} + \sqrt{1-c}}; \quad y = \frac{c}{2-c}$$

where d represents the distance of any parallel from the equator on the central

meridian; y the distance of the same from the equator on the marginal meridian or circumference; and c the ratio of any latitude to 90°.

The geometrical construction of the projection is extremely simple, as will be seen by Fig. 1, and it is in its favour that no special tables are required. Any map-draughtsman could construct a map of the world on this projection without difficulty in a very short time.

A comparison of the outline map of the world drawn on Mr. Van der Grinten's projection (Fig. 2) with those drawn on Mercator's and Mollweide's projections (Figs. 3 and 4) will give a good general idea of the relative merits and defects, and,

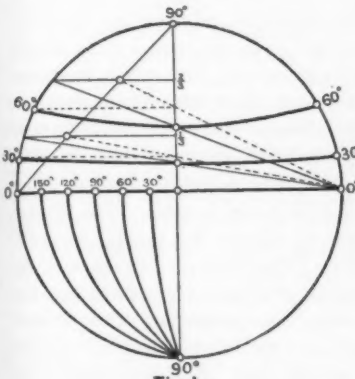
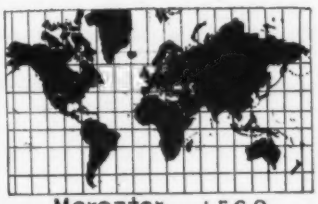
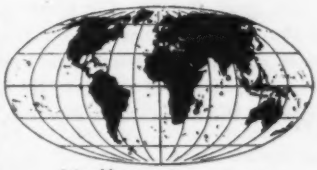


Fig 1

Van der Grinten 1898
Fig 2


Mercator 1569
Fig 3


Mollweide 1805
Fig 4

taking all things into consideration, there can be little doubt that Mr. Van der Grinten's projection possesses advantages over the others for special purposes, such as representing the geographical distribution of natural phenomena, oceanic circulation, trade routes, etc. For educational purposes it could hardly be recommended any more than the others referred to, and, indeed, in some respects it would be more likely to mislead the pupil, especially as it is circular in form and has the appearance of being a perspective projection. The apparent great distance of the poles from the continental land masses would be sure to lead to confusion. To obviate this to some extent, it is suggested by the author that for ordinary purposes the exaggerated northern and southern polar regions could be cut off, thus giving a map somewhat the appearance of Mercator's, while at the same time possessing the advantage of conveying a far more accurate idea of relative areas Even in this projection, however, the exaggeration in northern and southern

latitudes is considerable, and it is, indeed, impossible that it should be otherwise when it is remembered that the distance between the poles is shown on the map as exactly the same as the whole circumference of the globe at the equator.

THE MONTHLY RECORD.

THE SOCIETY.

Tribute to the Antarctic Expedition.—At the meeting of the Council of the Society, held previous to the Antarctic meeting in the Royal Albert Hall on November 7, the following resolution was unanimously passed: "The Council welcome the safe return of Captain Scott and the officers and men of the *Discovery* from their difficult and perilous, but most successful expedition. The Council record their high appreciation of the great services of Captain Scott, and of the qualities for command which enabled him to secure such complete results, which are far greater than were anticipated in every respect. The officers, including the civilian staff, were each in charge of a special scientific department,* but all helped each other. The warrant officers and the men have also earned cordial recognition for their zeal, discipline, and endurance under exceptionally trying circumstances. The Council notice with pleasure the perfect harmony which prevailed throughout the long period of this Antarctic service, and the loyal attachment that subsisted between the officers and men and their commander. To this good feeling, due alike to the rare gifts of the commander and the excellent dispositions of those under his orders, the great success of the expedition must be mainly ascribed. To all the explorers the Council resolve to accord most cordial and heartfelt thanks for their admirable services."

EUROPE.

History of the Tyne and Wear.—Mr. Woolacott has contributed a paper to the Philosophical Society for the University of Durham, on "The Geological History of the Tyne, Wear, and Associated Streams" (*Proceedings of the University of Durham Philosophical Society*, vol. ii. part 3, 1903), in which he points out that there have probably been four cycles of river and stream development in Northumberland and Durham. The first, between the Permian and Cretaceous times, affects only the upper courses of existing rivers. The second occurred between the post-Cretaceous uplift and the glacial period. Most of the smaller streams developed during this epoch have been totally obliterated by their valleys being filled with drift during the glacial period, and also many of the larger streams have had their courses changed. The Wear, probably a dip stream throughout its course, may

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* Armitage: navigation and magnetic observations at sea. Royds: meteorology. Barne: tidal observations. Mulock: cartography. Skelton: photography. Koettlitz: bacteriology. Wilson: vertebrate biology. Hodgson: invertebrate biology. Bernacchi: magnetism, seismology, pendulum observations. Ferrar: geology.

have been a tributary of the Tees, but was probably beheaded by a subsequent tributary of the Tyne, which had been developed along the edge of the outcrop of the Permian rocks along the line of the present Team. This would account for the Cleadon valley, which was probably further deepened by a small tributary of the Tyne before glacial times. The Tees, too, which once flowed by the valley of the Leven and the Esk to the sea, may also have been captured by a subsequent stream of the Triassic outcrop roughly parallel to that diverting the Wear along the Magnesian limestone. The third cycle began at the end of the ice age, during which many smaller valleys were obliterated, the larger ones being partly filled with drift. In many cases the streams cut through the rock rather than the boulder clay. The Wear eroded a new course from Durham to Sunderland, while the Team now flows in the pre-glacial valley over glacial deposits. The Tyne follows the general course of the pre-glacial valley, but has changed its bed considerably. To the north, the Blyth and Wansbeck and other streams are post-glacial with courses largely to the north, while the Sleekburn valley, between the streams mentioned, is pre-glacial. The fourth cycle began with the formation of the raised beaches of the district, which indicate a depression of some 150 feet, probably not uniform, but the changes brought about in this recent cycle have not been important. The denes, deep-cut, small, gorge-like valleys, between Sunderland and Castle Eden, run right across the raised beaches.

The Climates of Iceland and North-Western Europe.—We have received a reprint of an extremely valuable and suggestive paper published in the *Sitzungsberichte* of the Vienna Academy of Sciences by Dr. J. Hann, on the weather anomalies of Iceland during the period 1851 to 1900, and their relation to those of North-Western Europe during the same period. The paper is primarily a discussion of the remarkable series of observations made during many years by Herr O. Thorlacius at Stykkisholm, in north-western Iceland, and published in abstract in the *Journal of the Scottish Meteorological Society*. These observations have been treated more than once by Dr. Buchan in papers published in the Scottish Society's *Journal*, but Dr. Hann deals exhaustively with the full fifty years' record, and compares the results with similar records for Greenwich, Brussels, and Vienna, and for a shorter period with Punta Delgada, in the Azores. Many points of interest are brought out, but the most important conclusions are probably those revealed by the comparison of the Iceland and Azores records. These stations are situated near two great centres of atmospheric action—the one nearly on the axis of the permanent low-pressure belt of the North Atlantic, and the other in the high-pressure zone of the "horse latitudes." Dr. Hann finds that when pressure is excessive at Punta Delgada, it is in the majority of cases below the normal at Stykkisholm, and conversely, indicating a connection between the two. When the difference of pressure is greater than the normal during the winter months, the warm oceanic winds are stronger than usual, and temperature in Western and Central Europe is above the average; when the difference is less than the normal, the oceanic winds are weakened, and European temperatures are below the average. In the later sections of the paper Dr. Hann discusses the climate of Stykkisholm itself in greater detail, and compares it with that of Greenland, using the stations Angmagsalik and Godhaab. The results obtained with reference to the effects of föhn winds on the Greenland coast are of special interest. Dr. Hann's study of the problem by the application of quite general methods forms a very important addition to the more special researches of Pettersson, Meinardus, and others, and seems to bring us a step nearer to successful weather forecasting for long periods.

Old River Terraces near Vienna.—Two years ago, Dr. F. Schaffer called

attention in the *Mitteilungen* of the Vienna Geographical Society to the gravel terraces which line the hills around that city, some of which had not previously been recognized as bearing that character. He has since made a further study of the subject, to which he recurs in the same publication (Nos. 3 and 4 of the present year), pointing out the interest which it possesses, not only as throwing new light on the past physical history of the region around Vienna, but from the wider point of view of past changes affecting the whole region of Central and Southern Europe and the Mediterranean. Prof. de Lamothe, to whom, among others, Dr. Schaffer pointed out the river-terraces in the neighbourhood of Vienna at the meeting of the International Geological Congress last year, and who was quite prepared to accept Dr. Schaffer's interpretation of them, has for some time been investigating similar terraces on the Rhine, Moselle, and Rhone, and in Algeria on the Isser and the Mediterranean coast. The remarkable point brought out by these researches is the marked agreement in the altitude of the successive terraces of widely separated localities, which seems to point to a connection between their modes of origin. The terraces round Vienna show the same general agreement, as do also those lately described by Sevastos from the valley of the Sereth in Rumania, and thus seem to give new support to De Lamothe's conclusion, that we have here an evidence of past movements in the level of the Mediterranean, which have in turn influenced the physical history of the rivers of the adjacent continents. Dr. Schaffer hopes before long to discuss the subject in greater detail, and as Prof. de Lamothe is also continuing his investigations, the results will be awaited with much interest.

Tree and Bush Limits in the Eastern Alps.—The association for the protection of alpine plants has lately inaugurated a series of systematic observations on the altitudinal limits of the growth of trees and shrubs in the Eastern Alps, and though the data collected are not yet sufficient to allow of a complete discussion of the question, certain results have been gained, which are summarized by Karl Schmolz in the *Mitteilungen* of the German and Austrian Alpine Club (1904, No. 13). When the scheme was first set on foot by the association, great numbers of applications were made for the schedules which had been prepared in order to facilitate the recording of the data on a uniform plan, but comparatively few have been returned filled up. Thanks, however, to the enthusiasm of a few observers, 1018 determinations of altitude had down to last year been effected, and these cover the greater part of the Eastern Alps. In summarizing the results in tabular form, the writer gives the upper limit of growth in the case of three trees, the spruce fir, the larch, and the cembra pine ("zirbe"), distinguishing also the altitudes attained in the north and south of the range (the parallel of 47° being taken as the dividing line) and according to the aspect of the slopes. In the case of brushwood (juniper, dwarf willows, green alder, etc.), both the upper and lower limits are given. Of the three trees mentioned, the cembra pine reaches the greatest altitude, the average upper limit lying at 6526 feet, while single specimens reach 6775 feet. The mean for the three trees is 6129 feet, and the difference between the altitudes reached in the north and south of the range averages about 505 feet (the higher figure naturally referring to the south). As regards aspect, the slopes facing west give the highest figure in the case of all three trees, the northerly slopes coming next (on a general average), the southerly third, and the easterly last. The facts in regard to the smaller growths are more complicated and cannot be briefly summarized, but it may be mentioned that the means, for four kinds of bushes, of the average lower and upper limits of growth are 4934 and 6358 feet respectively. The difference between the northern and southern parts of the range does not appear to be so marked as in the case of the trees.

Distribution of Mean Height in Switzerland.—From various points of view, the influence on physical-geographical conditions of the mean elevation of a district is of more importance than that of its extreme elevation. Thus it has been shown that in Switzerland both the limit of tree-growth and the snow-line occur at a higher level where the general or mean elevation is a high one, than it does where the general elevation over an equal area is less, even though the extreme heights may be greater. A recent study of the distribution of mean elevation in Switzerland, carried out with much care by Dr. Liez, a pupil of Prof. E. Brückner, is therefore of considerable interest (*Jahresbericht Geogr. Gesells. Bern*, vol. xviii. pp. 1–38). The first part of the paper is taken up with an elaborate discussion of the methods employed for the determination of mean elevation, and the influence, on the results, of the various errors which may be introduced in the course of the calculation. The second part, to which alone attention can be directed here, discusses the results as put down in a series of tables and maps which accompany the paper. Dr. Liez's method was to divide the whole of Switzerland into a large number of natural units, formed by individual mountain groups (or by lakes), the mean elevation of each of which was calculated in turn. The tables give also the figures for each group representing the extremes of altitude, the volume and area, and also the total areas included within certain fixed contours (at intervals of 200 meters), and the areas included between each successive pair of contour lines. The first map shows the subdivisions adopted, and their corresponding mean elevations; but, in order to bring out the facts with greater clearness, the author has constructed a second map, on which lines are drawn dividing up the whole country into zones, each of which is characterized throughout by a similar mean elevation.* The map brings out clearly the threefold partition of the country between the Alps, the central zone, and the Jura, the dividing-line between the two former being that representing 750 meters. Within the Alps, the zone with a mean elevation exceeding 2000 meters takes an irregular course from south-west to north-east, being pushed southwards near the two ends by the valleys of the Rhone and Rhine, and northwards in the centre by the influence of the Ticino valley and the Italian lakes. Between these points it widens out and embraces two separate areas—those culminating in Monte Rosa and the Finsteraarhorn—with mean altitudes exceeding 2800 meters, while the widest area exceeding 2250 meters is at the eastern end, in the Engadine. The Mont Blanc area does not attain a mean elevation of 2500 meters. A difference between the Alps and Jura is seen (1) in the steeper fall of the latter towards the central zone; (2) in the smaller influence here exercised by the river valleys. Dr. Liez has also calculated the mean elevation of the three main divisions (Alps, central zone, and Jura), the figures being respectively (when the bottoms, not the surfaces, of the lakes are considered), 1654·7, 570, and 743·6 meters, or 5429, 1870, and 2440 feet. He also gives curves showing the relative areas of each falling to the various zones of altitude.

Philip Apianus's Survey of Bavaria.—A very complete study of the survey of Bavaria executed in the sixteenth century by the well-known geographer Philip Apianus, has been undertaken by Dr. Max Gasser, who publishes an article on the subject in the *Mitteilungen* of the Münich Geographical Society (vol. i.

* The exact course of the lines will, of course, depend to some extent on the arbitrary selection of the separate units, and will therefore represent the facts of distribution in a generalized way only. Thus, if valleys, rather than mountain groups, had been chosen as the units, the results would have been somewhat different. But the large number of the units is a guarantee that the results obtained are generally in accordance with definite facts.

part i.).* The survey was carried out under the orders of Duke Albrecht V. of Bavaria, and, as we know from Apianus's own statements, occupied the summer months of six years, within the interval between 1554, when the commission was first entrusted to him, and 1563, when the map was completed. The care and labour devoted to the work is forcibly described by Cellius in his funeral oration (*Tübingen*, 1589), in which we are told that during the course of the survey the whole of Bavaria was "dimensus, emensus, permensus, remensus." As to the methods employed, however, we have to fall back on a few somewhat vague statements by contemporaries, and an examination of the map itself. As already stated, this was completed in 1563, on a scale roughly corresponding to 1 : 50,000, while another on a reduced scale more fitted for practical purposes was brought out in 1568. The original map has long been lost, but a copy in forty sheets (of which thirty-six are preserved in the map collection of the Bavarian General Staff) was made by Lieut. T. H. Pusch in 1756–61; while the wood-blocks from which the smaller map of 1568 was printed are still in existence, and have permitted the taking of a series of reprints. The map was reproduced (with some alterations) by Petrus Weinerus in 1579, and again (almost in its original form) at Munich in 1651. With regard to the method adopted, the chief point to be settled is whether or no the survey was based on triangulation, as was thought by various early commentators. Dr. Gasser holds that, while there is no *a priori* reason for rejecting this idea, an examination of the map and of the statements of contemporaries shows that it is untenable. He examines carefully the technique of the map, its scale, etc., and finds that the discrepancies from the reality are too great to permit the supposition of triangulation. The description by Georg Galgemair of the surveying instrument invented by Apianus throws the best light available on the method adopted, and shows that the survey was largely based on compass bearings from elevated positions, and that it formed a remarkable combination of the method of polygons with that of intersections. The determination of distances was largely by estimation, depending in part on hearsay only, and the scale is found to differ considerably in different parts of the map. In its construction, much care was bestowed on the fixing of the geographical co-ordinates of the principal places, an extensive series of latitudes being obtained by original astronomical observations, at which Apianus was an adept. The difficulty of obtaining longitudes seems to have been surmounted by the method, explained by Gemma Frisius, of combining the difference of latitude with the direct distance between pairs of places. A comparison of the smaller with the larger map shows that, although the former naturally contains less detail, in some cases it supplies data not included in the other; the reduction, however, seems to have been effected by squaring the surface. A comparison with modern maps is of interest as indicating changes that have taken place, as, *e.g.*, in the extent of wooded areas. It shows, also, how carefully the river-system was laid down by Apianus. In conclusion, the writer expresses the opinion that the survey was the most complete, not only of the time in which it was made, but of the whole period down to the introduction of triangulation.

ASIA.

M. Gervais-Courtellemont in Western China.—Ever since the French traveller, M. Bonin, discovered some years ago the remarkable bend made by the upper Yang-tse in the neighbourhood of Li-kiang-fu, the district has exercised a considerable attraction for explorers, several of whom have since visited the locality.

* The *Mitteilungen* form the continuation of the *Jahresberichte* hitherto issued by this society.

The latest of these is M. Gervais-Courtellemont, who last year made a journey in this region accompanied by his wife, by whom a short account of the journey has been given in the *Revue de Géographie* for September 1 of this year. It is somewhat singular that the travellers should, like some of their predecessors, have regarded the question of the bend of the Yang-tse as still presenting a geographical problem at the time of their visit, although, after the report of M. Bonin's journey had appeared, there could be no valid ground for doubting the correctness of his statement. Mme. Gervais-Courtellemont says that a controversy had arisen between French and English geographers on the subject, but the only apparent ground for this statement seems to be a remark which was made in the *Journal* when the first announcement of M. Bonin's discovery came to hand, that it was difficult to reconcile his view with the results of former work in this region. As we remarked when further details were available, and have since repeated on various occasions, the difficulty spoken of arose from the incorrect representation of the bend of the river in the preliminary sketch-map issued by the Paris Geographical Society and was completely eliminated when the more detailed account was published. Without supplying a complete survey of this part of the river, which the nature of the country would render a difficult task, M. Courtellemont has done something to permit the bend to be laid down with more precision than hitherto. Like Mr. Consul Litton, whose visit to this region was referred to in the *Journal* for June last (p. 783), the French travellers went north from Li-kiang-fu up the centre of the great bend, but, unlike Mr. Litton, kept on in this direction until the river was struck at the northern extremity of the loop. The course of the river is said to have been sighted from points of vantage at seven different places, but many of these lay at a considerable distance from the route. The journey was made under some difficulties owing to the wild and rugged nature of the mountains (the main range of which lay to the left of the route), and the snow which fell constantly, but M. Courtellemont kept up his plane-table work throughout. The river is said to flow in steep-sided cañons, having cut down its bed to a great depth through the limestone formation, but volcanic forces are called in as an explanation of the rupture of the chain to allow of the passage of its waters. Whether any evidence for this hypothesis was obtained is not stated.

Journey in Eastern Tibet.—We are informed that an American traveller, Mr. F. H. Nichols, reached Bhamo on September 12 last, after a journey in the Chinese-Tibetan borderland. He left Chungking in September, 1903, and made his way, apparently by the usual route, to Chiamdo on the upper Mekong, where he spent several months in a lamasery learning Tibetan, with a view to pushing on towards Lhasa. In this he was disappointed owing to the advance of the British expedition, and therefore went south to Tali and Bhamo.

AFRICA.

Major Powell-Cotton's New Expedition.—On November 2, Major Powell-Cotton left London for Khartum *viâ* Marseilles and Cairo. He intends to proceed up the White Nile to Lado, where he hopes to be met by a Swahili caravan from Uganda and an armed escort. Striking south from this point, the explorer will pass through the eastern side of the Great Forest, probably visiting the Semliki and the western slopes of Ruwenzori. Thence he will make his way along the country to the immediate west of the watershed of the Tanganyika and Congo systems southwards towards Katanga. Eventually Major Cotton hopes either to traverse the whole of the eastern side of the Congo Free State, reaching British territory in Nyasaland, and then proceeding to the coast, or to steer right across German territory. His objects, which are mainly zoological, are to try and increase

our knowledge of the okapi, obtain specimens of the giant pig in the Great Forest, and ascertain the truth about the water-lion, said to inhabit the upper Congo waters.

Journeys in Ruanda.—An interesting account is given in *Globus* (vol. 86, Nos. 1 and 5) of journeys in the extreme west of German East Africa made in 1802–3 by Lieut. von Parish, who went out in 1901 as an officer in the military forces of the Protectorate, and at the end of the same year received the appointment of commandant of the German post of Ishangi, on Lake Kivu. During his residence here and his subsequent journeys in Ruanda his health suffered severely, and being ordered home on this account, he died almost immediately after his arrival in Germany. His notes on his journeys, which contain vivid descriptions of this interesting corner of the German territory, as well as particulars as to the native tribes, have been prepared for publication by Baron Parish von Seftenberg, and are illustrated by instructive photographs of the country and people. The first journey led east from Lake Kivu, over the picturesque mountains which bound its trough on this side and across the valley of the Nyavarongo to Nianza, the capital of King Msinga of Ruanda, to whom he was sent on a mission in company with Captain von Beringe. The king, who has only been visited by a few Europeans, belongs, as is well known, to the race of the Watussi, the northern intruders into this region, who have here obtained the sovereign power, though in some other districts they are subject herdsmen. The king is one of the few remaining African potentates who still retain a considerable amount of barbaric power, little touched by European influence, though he has latterly shown himself well disposed to his German neighbours. He and the other Watussi are of quite gigantic stature, and have well-formed features, often quite Semitic in type. From Nianza the two officers went north, striking the Nyavarongo near where it was crossed by Von Götzen, and ascending the Mkunga, a stream of equal volume, whose valley forms a direct continuation of that of the upper Nyavarongo, which makes its sharp bend to the east just at the junction. This region is one of running streams, waterfalls, lakes, and mountains, and seems a fitting cradle for the ultimate headstreams of the Nile. The photograph of the Mkunga (merely one out of many of these headstreams), gives a striking impression of the amount of water that must be gathered from this mountain region into the Kagera. Its valley, which is described as of great beauty, was followed up to the twin lakes Ruhondo and Mwuleru, from which it issues. The latter is surrounded by high mountains, and presented a particularly imposing appearance. During this time constant views were obtained of the great Kirunga volcanoes, some of which the travellers now ascended before making their way back to Lake Kivu. During the whole journey great cold was experienced. Lieut. von Parish's second journey, made in spite of increasing ill health, led by a different route to Msinga's capital and the German mission station of Isawi. Lake Kivu was left at Bujonde, about the middle of the eastern shore, and the route was found to be a comparatively easy one, and is recommended as the best permanent line of communication between the Victoria Nyanza and Kivu. It would, however, necessitate a ferry across the Nyavarongo, which where crossed was a deep stream. Lieut. von Parish came across many of the Watwa, the so-called dwarf race of this region, who had been subjected by the Wahutu before these in turn fell under the domination of the Watussi. Though small by comparison with the Watussi, they did not seem, on the average, much inferior in stature to the Wahutu. The latter will not eat or sleep in company with them, though the Watussi have no such objection. The return march to the south end of Kivu led through a little-known country, difficult on account of the steep ascents and descents, but of the beauties of whose fern-clad slopes and primeval forests a glowing description is given.

Former Glaciation in South Africa.—The evidence for a former extensive glaciation in South Africa, which has for some years been gradually increasing, thanks to the work of the geological survey officers, as regards Cape Colony, Natal, etc., has lately been extended to the Transvaal, where Mr. E. T. Mellor has found glaciated surfaces in the district between Pretoria and Balmoral (*Trans. Geol. Soc. S. Africa*, vol. vii. part i., 1904). Mr. Mellor's observations may be summarized thus: In the district lying between the Eland's river and Balmoral, outlying patches of glacial deposits representing the lower portion of the Karroo system are of frequent occurrence. They consist (apart from some sandstones and shales) chiefly of conglomerates, presenting a general similarity to boulder-clays, although the matrix is often rather of a sandy than clayey character. The contained boulders are very miscellaneous in size and composition, but always include a preponderance of rocks occurring most abundantly or exclusively to the north of their present position. The glacial deposits were laid down upon a land surface of considerable variety, many features of which reappear with slight modification in the present landscape. Where the glacial deposits have been only recently removed, glaciated rock-surfaces are of frequent occurrence, presenting a characteristic polish and striation. The direction of the striæ (which is very constant over widely separated areas), together with the distribution of the boulders, shows that the direction of the ice-movement was from north-north-west to south-south-east. Lastly, that the ice-sheet was of very considerable magnitude is shown by the extent of the deposits and their occurrence at very various levels, as well as by the parallelism and constancy of direction of the striæ.

The Census of British South Africa.—The tabulated results of the census of the various South African colonies, carried out early in the present year, were presented to Parliament in July last as an official report (Cd. 2103). We can only refer here to the more general figures, though the tables include a large amount of detailed information as to race, sex, and age distinctions, besides giving the individual figures for the various census districts, and in some cases for the chief towns. The general totals for the respective colonies and protectorates are as follows:—

	Whites.	Coloured.	Total.
Cape Colony	580,380	1,825,172	2,405,552
Transvaal and Swaziland ...	300,225	1,053,975	1,354,200
Orange River Colony ...	143,419	241,626	385,045
Southern Rhodesia	12,623	—	—
Natal	97,109	187,582*	284,691*

The increase in the total population of Cape Colony is 57·51 per cent. since 1891, while the percentages for the white and coloured population are 53·96 and 58·68 respectively. In the Orange River Colony the percentages to total population of white and coloured respectively, which in 1890 had been 37·45 and 62·55, amounted in 1904 to 37·25 and 62·75 respectively, or a very slight relative increase of natives. The relative increase of natives since 1880 is, however, much more considerable. In Southern Rhodesia the total net increase of whites has been 1591 in the past three years. The coloured population of the Transvaal includes a small proportion (1·7 per cent. of total population) of non-native races, while in Natal the number of Indians alone reaches 100,918.

* Exclusive of native areas.

AMERICA.

Exploration in Northern Alaska.—The most valuable addition yet made to our knowledge of Northern Alaska is that resulting from an expedition sent out in 1901 by the United States Geological Survey under Messrs. W. J. Peters and F. C. Schrader, which has lately been described in detail in a publication issued by the Survey (Professional Paper No. 20, Washington, 1904). Previous to this expedition our knowledge of the northern interior had depended chiefly on journeys made by Lieut. Howard, of the U.S. Navy, in 1886, and by Mr. J. H. Turner, in 1890, but as neither of these was able to carry out a regular survey, the recent expedition is the first which has executed a survey with precise instruments from the Yukon to the north coast. It has also, for the first time, supplied an accurate general knowledge of the physical features of this part of North America. In 1899 the discovery had been made of the probable existence of a passable route between the upper Koyukuk (a northern tributary of the Yukon, and the Arctic coast, and of this it was decided to take advantage, more especially as the gold fever following on the Klondyke discoveries had led to the foundation of a trading post at Bergman, 500 miles up the Koyukuk river. In order to avoid the necessity of wintering in this inhospitable region, a start was made from Skagway early in February, the journey down the Yukon being done by means of dog-sledging ("mushing," as it is termed). Bergman was reached on April 10, but it was then necessary to wait some time for the breaking of the ice on the Koyukuk, a description of which is given by Mr. Schrader. As in other arctic rivers, it was characterized by the arching of the ice—that in the centre being raised to a considerable height above that at the margins. Mr. Schrader thinks this is due to the permanent subterranean frost, which grips the ice with a firm hold to the shores. From Bergman the party proceeded 80 miles up the river by steamboat to Bettles, a new supply post near the 67th parallel. Starting hence on June 13, John river, a large tributary of the Koyukuk, was ascended in canoes to its headwaters, and a portage of 5 miles made through the mountains to the Anaktuvuk, the large east fork of the Colville,* which was descended to the Arctic coast. This was then followed to Point Barrow (in part in company with Eskimos), and the journey continued in an open whaleboat until a steamer was happily met at the Corwin coalfields (September 18). During the overland journey from Bergman a survey was carried out by a combination of plane-table work, triangulation, and tacheometry, while a geological examination of the country was made throughout. Mr. Schrader gives an excellent sketch both of the geographical and geological features of the region, but it is possible here to refer to the most important of these only. Three well-marked natural provinces are defined—the mountain or middle, the Koyukuk or southern, and the Arctic slope or northern. The mountain zone is regarded as the true prolongation of the Rocky mountain system, which bends westward across the international boundary, taking the curve characteristic of the concentric orography of Alaska, and embracing the Yukon basin and plateau to the south. Westward it seems to split into two branches, of which the northern terminates in the abrupt cliffs of palæozoic rocks at Cape Lisburne. The northern province is formed by a gently rolling plain bordering the mountains, and giving place seawards to an almost level tundra. These plains are considered to be the counterpart of the great plains of the western United States, while the Yukon basin seems to represent the Great Interior basin. The mountains—for which, in the section under review, Mr. Schrader adopts the

* The Colville, it will be remembered, was at one time imagined to be the termination of the Yukon, and was so shown on many maps of the middle of the nineteenth century.

name Endicott mountains, originally used by Allen in 1885—form a rugged range with a general elevation of from 5000 to 7000 feet, having the appearance of a dissected ancient plateau or peneplain. It falls more steeply to the north than to the south. The Koyukuk province again seems composed of two zones, at a higher and lower level, the features of which have been carved from two former plateaus. The Colville river, which drains the northern plains, is a large stream with a current varying from 2 to 6 miles, the latter figure referring to places where rapids occur. These would not exist, probably, at high water, which seems to take place in June. It has evidently long been cutting westwards, on which side it has high bluffs, while an extensive series of flats fringes the eastern side. This is ascribed to a general tilt of the country. The delta measures some 20 miles from east to west, and the number of mouths is greater than has been supposed. The geological formations of the country explored comprise representations of most of the geological ages from Silurian to recent, and the past structural history of the region is discussed at some length by Mr. Schrader.

An Instance of Geographical Influence upon Human Affairs.—The contrast between the old and new drift, not merely in the surface conditions, but in the economic ones, is very clearly shown in Illinois, where the great Shelbyville moraine practically separates the old drift-covered county of Cumberland to the south from the new drift-covered county of Coles to the north. The soil in the south is a heavy, rather compact grey clay, comparatively free from organic matter, overlying a greyish subsoil; while in the north the black soil, rich in humus, is a loose light loam, richer in sand, generally coarser in grain, and covers a yellow subsoil, passing downward into blue. The land requires different working. The loose northern newer drift has more marshes, but many have been drained and yield rich soil. In the impervious clays tilling would be useless, and, moreover, the natural drainage is much better developed than in the north, where the valleys are less mature. The great stream development in the south is very clearly marked on a river map. The northern farmers call their own land God's country, but the older drift beyond the morainic height, Egypt! Outside valley floors land costs from £5 to £25 an acre in the north; £3 to £6, more rarely £8, an acre in the south. The yield of crops justifies this. In Coles maize yields 30 to 40 bushels per acre, wheat 7 to 14, oats 36 and over, but hay is relatively less important, while the total value of crops per square mile is £1000 and upwards. In Cumberland maize yields only 20 to 30 bushels per acre, wheat less than 7, oats 20 to 28; hay, mowed mainly by machinery, is here from a third to a half as much again per square mile as in Coles, but the total value of crops per square mile for the entire county is only from £500 to £1000. The density of population was 65·6 per square mile in Coles in 1900, but only 46·1 in Cumberland. The town population is greater in Coles, 16,000 out of 34,000; whereas in Cumberland it is only 3000 out of 16,000. Deducting this, the density of the country area is about the same in the two counties. The greater prosperity of the northern county, however, is indicated by the number of townspeople it can support. It is remarkable that the greater prosperity of the northern county is shown, not merely in the better dwellings—log houses still are common in Cumberland—but even in the percentage of illiterates, which is 2·24 in Coles, 3·58 in Cumberland.

Honduras.—According to a monograph on Honduras issued by the International Bureau of the American Republics, the total tonnage entering its ports in the year 1901-2 amounted to 876,322, an increase of 385,123 on the tonnage of the preceding year. There are now 60 miles of railway traversing its richest agricultural districts, and transporting its produce to Puerto Cortes. The telegraph-lines in 1902 measured a length of 3249 miles. With its varied climate and fertile soil

everywhere covering its lowlands and highlands, Honduras has great agricultural capacities. But its farming is still very backward, and must continue so till there are better roads, better markets, and cheaper transport. The native rarely raises more crops than will suffice him till a new harvest is gathered in. Few fields are properly ploughed, and the sown crop is left to itself. Recent years, however, show in all parts a decided advance agriculturally. Corn is the chief article of food, and maize is grown everywhere. Though two crops a year are secured, yet the supply is always short of the demand. Tobacco and coffee are raised in the mountainous districts of the west and centre. The fruit-growing region lies along the Caribbean sea, and from its ports hundreds of thousands of bananas are shipped annually to the gulf ports of the United States. Coffee-growing has struck root of late years, and Honduras coffee is of excellent quality. The cultivation of potatoes and vegetables is steadily improving and extending. About 2920 acres have been recently reclaimed by the introduction of artificial canals. This, however, is but an insignificant area compared with the area reclaimable and convertible into profitable fields. The plain of Comayagua, a barren waste in the dry season, might be turned into a fruitful garden all the year round. The broad alluvial plain, again, in the Gulf of Fonseca, now desert for five months in the year, might likewise without difficulty be made into a profitable farming district. The land under cereals in 1902 comprised 15,351 farms: 16,000 acres were under banana cultivation, 7600 acres under plantains, 5140 acres under sugar-cane, and 3700 acres under indigo. There are reported to be 410,850 orange and lemon trees, 1,239,428 coco-nut trees, 13,317,607 coffee trees, and 300,000 fruit trees of other kinds.

Railways of Brazil.—An official report (Miscellaneous Series, No. 617) by Mr. H. C. Lowther, Secretary to His Majesty's Legation at Rio de Janeiro, gives a concise account, geographical, historical, and financial, of the railway system of Brazil. The text is illustrated by maps exhibiting the lines now in working and those in construction or projected. Among recent constructions, a line lately completed between Nova Cruz and Independencia now connects the Natal and Parahyba lines. The city of Pernambuco has also for some time been joined to the Parahyba system. The original line to Palmares has likewise been connected with the line running inland from Maceio. And from this connecting link a branch extends west as far as Garanhuns, being intended to eventually reach the São Francisco river. This extension effected, uninterrupted railway communication would be established from Natal through the states of Rio Grande do Norte, Parahyba, Pernambuco, and Alagoas. Another projected line is that from Itabayanna, in the state of Parahyba, to Campina Grande, the centre of the cattle district, with ultimate extension across Parahyba into the states of Ceará and Piauhy. It is also proposed to extend the line now terminating at Garanhuns in two branches to the São Francisco river at the two extremities of the Paulo Affonso railway, which connects Piranhas with a point on the river above the cataracts. Crossing the river at Piranhas, the south branch would be carried through the state of Sergipe and connect with the Bahia system. The other branch, crossing the river further north, would also penetrate into the state of Bahia. The northern ports would by this means be brought into touch with the port of Bahia by an overland route. An unbroken line of communication would thus run through the states of Piauhy, Ceará, Rio Grande do Norte, Parahyba, Pernambuco, Alagoas, Sergipe, and Bahia. No less important are the extensions projected further south. The authorized programme for 1904 includes *inter alia* the extension of the Melhoramentos railway to join the Rio d'Ouro line at Sande; the completion of the Porto Alegre—Uruguayana, and Pernambuco—Pesqueira lines, with branches to Santa Anna do Livramento; and the construction

of a line in Rio Grande do Norte, starting from a point on the coast and traversing the districts suffering from drought. There still remains a complete break in railway communications between the Bahia and Minas line on the north and the Rio Doce in Espirito Santo on the south, while of course the remote inland regions of the west lie at present quite outside the scope of railway communication.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

The Description of Climate.—In the introduction to the recently published 'Climatography of Lower Austria,' Dr. Julius Hann gives expression to certain views on the best methods of describing climate. Dr. Hann points out that a true description of climate must set forth a real part of the life of nature. It must give an intelligible account of the manner in which the meteorological elements work together to produce the final result summed up in the conception of climate—the relation of the situation of a region to its natural vegetation; and also specially to the conditions of culture and production, the positions of human settlements, and the mode of life of their inhabitants, in so far as these are affected by atmospheric influences. But the records of modern meteorological stations scarcely furnish more than a statistical skeleton for such descriptions. In the statistical basis the essential point is that the meteorological values shall be comparable as regards means, extremes, and variability. For the relatively small area of a single country the distribution of atmospheric pressure is without climatic significance; it concerns rather the larger parts of the Earth's surface, and the causes and consequences of the distribution of winds and their variations. Meteorological records, as ordinarily kept at present, contain by no means all that must be regarded as desirable from the climatographic standpoint. The "non-instrumental" observations, such as the dates of the last frost in spring and the first in autumn, and phenological observations generally, are not made with sufficient regularity to allow of proper discussion. Local variations of climate, like those due to the influence of exposure, positions in valleys or on slopes, or in the shade of mountains, can be much better studied in relation to these phenomena than from a discussion of instrumental records. Again, any climatography which is so easily applied to the elucidation of agricultural problems is seriously deficient without such non-instrumental records. Careful observations should also be made of the local distribution, frequency, and intensity of hailstorms, especially of the occurrence of destructive falls of large hailstones. In this respect Austrian meteorological records are still deficient. Reports on thunderstorms, which were introduced some years ago as a permanent part of the regular Austrian service, belong to the same category.

GENERAL.

Improving the Knowledge of the British Empire.—An important movement has been set on foot, which, if well carried out, should lead to excellent results in the way of a diffusion of more thorough knowledge of the British Empire, both in this country and the colonies. It is proposed to effect this object through the schools of the Empire, for use in which the preparation, by a thoroughly competent hand, of a series of lessons or lectures, to be illustrated by good lantern slides, has been suggested. The scheme enjoys influential support, having been first proposed by Mr. M. E. Sadler when at the Board of Education, and since adopted by the Colonial Office, at whose instance a committee was lately formed to further the objects in view. The committee has drawn up a syllabus of seven lectures on the United Kingdom, intended primarily for use in the colonies of

Ceylon, the Straits Settlements, and Hong-kong (each of which has contributed to the cost), and Mr. H. J. Mackinder has been asked to undertake, and has accepted, the task of preparing the lectures and generally supervising the scheme. Before being printed, the lectures (which will aim at giving children through their eyes, as well as their ears, a true and simple impression of what the United Kingdom and its people are like) will be delivered in a London Training College for elementary teachers. Meanwhile Mr. Mackinder has arranged to give, on December 7, an account of the scheme in a lecture to be delivered at the Whitehall Rooms, Hotel Metropole, at 5 p.m. It is hoped that those interested in promoting mutual knowledge of the various parts of the Empire will be present. It is anticipated that the Eastern Colonies will also supply material for similar lectures upon them, to be used in this country.

The British Science Guild.—With a view to cultivating the scientific spirit in this country, and bringing home to all classes the necessity of applying scientific treatment to affairs of all kinds, an association has lately been formed under the name of "The British Science Guild," which will endeavour to further the objects in view by means of publications and meetings and other similar methods. The guild will aim at bringing before those responsible for the carrying on of the nation's activities the importance of the extended application of scientific principles, and, in particular, will endeavour to promote scientific education by encouraging the support of universities and other institutions where science is represented. An organizing committee has already been formed, and Sir Norman Lockyer elected president of the guild, membership of which is open to all British subjects. It may seem to some surprising, not to say humiliating, that so elementary a principle as the importance of well-ordered knowledge to the successful prosecution of any enterprise should stand in need of championing by an association of the kind at this late period in the nation's history. But there can be no doubt of the benefits that would accrue from a still wider recognition of the principle, and it may be hoped that the efforts of the new body may meet with the success which they certainly deserve. The Secretary is C. Cuthbertson, Esq., 9, York Terrace, Regent's Park, London, N.W.

Geographical Awards at the St. Louis Exhibition.—The exhibits bearing on geography at the St. Louis International Exhibition were placed under two separate groups of the Department of Liberal Arts, viz. (17) Books and Publications, and (18) Maps and Apparatus for Geography. The awards for such exhibits to British exhibitors in these groups, which had been approved by the Superior Jury up to October 20 last, were as follows: In Group 17, gold medals were given to the Royal Geographical Society, the Egypt Exploration Fund, and the Palestine Exploration Fund. In Group 18, the Grand Prize—the highest honour granted—was awarded to the Ordnance Survey, the Royal Geographical Society, the Hydrographical Department of the Admiralty, the Survey of India, the Palestine Exploration Fund, and to Messrs. J. Bartholomew & Co. Gold medals were awarded to Mr. Edward Stanford (with silver medal to Mr. John Bolton as Collaborator), to Messrs. W. & A. K. Johnston, and to Mr. George Armstrong (as Collaborator to the Palestine Exploration Fund). A silver medal was also awarded to Messrs. Cary and Porter, Ltd., for the surveying instruments supplied to the Royal Geographical Society and exhibited under the auspices of the latter. British Geographical exhibitors have, therefore, every reason to be content with the results of the awards, having secured six grand prizes out of a total of 130 awarded to British exhibitors under all departments.

OBITUARY.

Field-Marshal Sir Henry W. Norman, G.C.B., G.C.M.G., C.I.E.

By the death of Sir Henry Norman the Royal Geographical Society has lost one of its best supporters—one of its most trusted Councillors. Always at his post, and always ready to give the best of his attention to the business in hand, this man, who had been member of the highest councils of the land, governor of British colonies, and nominated Viceroy of India, never seemed to think time wasted or energy spent in vain over the consideration of the most trifling details of the Society's administration. He was indeed a model councillor. On a raw, foggy November afternoon, when a few scattered military enthusiasts had collected together in the arena of the United Service Institution lecture hall to listen to a technical address, I have heard Sir Henry Norman express a strong opinion on the absence of members of the council of that institution who had more concern for their health than for the support of the lecturer.

Field-Marshal Sir Henry Wylie Norman, G.C.B., G.C.M.G., was born December 2, 1826, and joined the Indian army in 1844, serving as adjutant of his regiment (31st Bengal Infantry) through the Sikh wars. During the period intervening between the conquest of the Punjab and the Mutiny, Norman (associated with Sir H. Lumsden and Lord Roberts in the early stages of their military career) was much employed on the staff of the Indian army (chiefly in the adjutant-general's department), and it was then that he made acquaintance with the frontiers of India under Sir Charles Napier and Sir Colin Campbell; and it was then, no doubt, that he formed his first views on the policy that should be adopted by the Indian Government towards the frontier tribes and Afghanistan. He was always a strong advocate for "non-interference," and it is possible that our present position on the north-west frontier, where our boundaries are still, practically, the boundaries that we inherited by right of conquest from the Sikhs, is largely due to his insistence and his influence. His political views on this subject did not, however, impair his active interest in the extension of geographical knowledge of the border land by any means short of military measures. He never for an instant ignored the necessity for a widespread acquaintance with frontier topography. During the stirring times of the Mutiny, Norman was at the front and constantly busy. We find him associated with Roberts in the risky work of superintending the final arrangements for the last great assault on Delhi, and subsequently with the Cawnpore field force, and at the capture of Lucknow by Sir Colin Campbell. It was during the attack on the Residency that Norman especially distinguished himself. He was afterwards wounded at Bareilly; in short, he was in the thick of the fighting during the whole Mutiny period, and his subsequent reports and narratives of the events in which he bore so distinguished a part are known to military students all the world over.

Then his advancement was rapid. He became military secretary to the Duke of Cambridge, acted as Adjutant-General to the Indian army, and was appointed military Member of Council in India in June, 1870. In India he was best known as the "father" of the Indian Staff Corps; and although that institution has been much criticized, and finally died a natural death some two years before that of its great originator, it may well be doubted whether, on the whole, it did not answer its purpose efficiently, even if it involved certain difficulties in military administration.

Norman took up a strong position as an opponent of what has often wrongly been called the "forward policy" in India. He was opposed to the Afghan war;

he was opposed to the occupation of Kandahar; he even advocated the abandonment of Quetta; and yet he certainly was no advocate for "masterly inactivity," and there is good reason to suppose that the policy of reduction in the Indian army, combined with a general curtailment of military expenditure in India to which he was asked to pledge himself by Gladstone, was one of the chief reasons for his final refusal of the Vice-royalty of India in succession to Lord Lansdowne. It is not difficult to reconcile such views if we regard Sir Henry as strong for a defensive, whilst deprecating an aggressive, policy in India.

But the refusal of such a magnificent offer marks the character of the man more surely than reams of writing could do. Devoted to his ideal of duty, unswerving from the straight path of honour, he would admit of no compromise with his convictions. On retirement from the Indian council, Sir Henry was appointed Governor of Jamaica, and afterwards (in 1888) Governor of Queensland. He was made Governor of Chelsea Hospital in 1901, and was gazetted Field-Marshal in June, 1902. During these later years he was a constant and consistent supporter of the Royal Geographical Society, where he won the friendship and esteem of all those who were associated with him on its Council. Modest, unassuming, kind-hearted, and generous, his best advice and assistance were always at the service of his friends, and in the long roll of illustrious names which are associated with the records of the Society, none will carry with them happier memories of grave and courteous consideration of all its many varied interests than that of Sir Henry Wylie Norman.

T. H. H.

Edward Stanford.

Mr. Edward Stanford, the well-known map publisher, died on November 3, 1904, in his seventy-eighth year, at Sidmouth in Devonshire, where he had lived in retirement for seventeen years, suffering the martyrdom of chronic asthma. He was born in London, and educated at the City of London School, and became a Fellow of our Society in 1853.

His interest in maps was first aroused when he joined Mr. Trelawney Saunders as an assistant in 1848. Mr. Saunders had created a map and chart business at 6, Charing Cross, next door to Augustus Petermann, who was at that time working as a geographical draughtsman in London. In 1852 Mr. Stanford became a partner in Mr. Saunders's business, and in 1853 the partnership was dissolved and he became sole proprietor. After establishing himself firmly in his new business, he commissioned the late Dr. Alexander Keith Johnston to construct and engrave a series of library maps of the great continents, the finest series of maps published in this country since the grand series of wall maps produced by Aaron Arrowsmith at the close of the eighteenth century. During the time that these maps were in preparation and in course of publication, Mr. Stanford employed Mr. Trelawney Saunders in superintending the construction of a library map of London. At this time the sole official survey of London was a skeleton map showing main roads only, surveyed by the Royal Engineers for the Commissioners of Sewers of the Metropolis on a scale of 12 inches to 1 mile. Using this 12-inch map as a groundwork, surveyors were employed to fill in the details, and as fast as the sheets came in from the surveyors they were reduced to the scale of 6 inches to 1 mile, and were engraved with infinite pains on steel plates. This map was completed and published in 1862, the most perfect map of London that had ever been issued. In 1873, after the death of John Arrowsmith, the copper plates of the maps forming his London atlas were bought by Mr. Stanford, who proceeded at once, with

his accustomed energy, to have the plates, which had been suffered to remain much in the state they were on first publication, corrected and brought up to date, afterwards supplementing them with many new plates. This atlas was first published by John Arrowsmith in 1834 with fifty plates, and received the honour of a special article in the Society's *Journal* for that year. Mr. Stanford re-issued the atlas in 1887 with ninety plates. An atlas of this magnitude can only be perfected by gradual additions in successive issues, and it was in this manner that Mr. Stanford designed to perfect the atlas originated by John Arrowsmith on the recommendation of his friend Thomas Murdoch. In 1882 a survey of the island of Cyprus on the scale of 1 inch to 1 mile was executed by Captain (now Lord) Kitchener and Lieut. (now Major) S. C. N. Grant, by order of the High Commissioner; but after the survey was completed there were no funds available to engrave and lithograph it. Mr. Stanford undertook to engrave and publish it at his own expense, a very public spirited piece of work, as it was not expected to be a commercial success. The map, engraved on fifteen copper plates, was published in 1885, and has been of great use to the Cyprus Government. Mr. Stanford's business was compulsorily removed in 1873 from 6, Charing Cross by the Metropolitan Board of Works, for the purpose of making Northumberland Avenue, and again from 55, Charing Cross by the Office of Works for the forming of the new street from the Mall to Charing Cross. On the 31st Dec., 1885, Mr. Stanford finally retired from business, having previously presented to our Society a complete set of his publications in a series of ten cases.

J. B.

CORRESPONDENCE.

Dr. Sven Hedin's Observations on Sand-dunes.

On p. 543, vol. xxiv., of the *Geographical Journal* (November, 1904), Dr. Sven Hedin writes—

"In between these stupendous waves of sand . . . there exist hollows or kumatic valleys. . . . Each is called by the natives a *bajir*, and forms a small self-contained basin, with a clay bottom, and is surrounded by sand, steep on the east side, and with a slow ascent to the next crest on the west. The lakes on the right bank of the Tarim are nothing but *bajir* depressions of this character, which by pure chance have become filled with water."

Readers of the *Journal* may be interested to refer for illustrations of such forms to my paper "On Desert Sand-dunes bordering the Nile Delta," January, 1900, Plate II., Fig. 24; and to that "On Sand-waves in Tidal Currents," August, 1901, Plate I., Fig. 12. The first figure is a photograph of a hard-bottomed depression of the *bajir* form among sand-hills; the second shows a chain of lakelets of the same form. Their homology with the dry depressions, or *fuljes*, is stated on p. 182.

Dr. Sven Hedin's observations on so large a scale, and among such different surroundings, illustrate the almost mathematical precision which is attainable in the study of surface forms in granular materials.

Vaughan Cornish.

"The Balkan Peninsula."

Je reçois au bord de la mer le *Geographical Journal* de Septembre.

J'y trouve (p. 345) un article relatif à un mémoire lu à la Société de géographie de Roumanie par M. Stourdza dont je n'avais pas eu connaissance.

Je partage son opinion. Il est tout à fait illogique de classer dans la région

balkanique la Roumanie, pays qui appartient à la region karpatienne. Il m'a toujours paru illogique aussi de comprendre le Peloponèse et même le reste de la Grêce dans une division territoriale qui emprunte son nom aux Balkans. Il est nécessaire, pour les géographes, et particulièrement pour l'enseignement de la géographie, d'avoir une dénomination spéciale pour chacune des trois péninsules de l'Europe mêridionale. Mais laquelle?

M. Stourdza propose "Péninsule Thraco-illyrienne." Je n'ai aucune objection à faire contre cette dénomination.

Il y a trente ans, quand j'ai commencé à composer des ouvrages de géographie classique, j'ai adopté une autre dénomination que j'ai toujours conservée et que je me permets de vous soumettre, celle de *Péninsule pélasgique*.

J'ai donné à chacune des trois grandes péninsules un nom simple, tiré de l'ethnographie.

Péninsule Ibérique (je ne dis pas Hispanique, puisque le Portugal y est compris).

Péninsule Italique.

Péninsule Pélasgique.

Sans doute le mot "pélasgique" est vague, comme l'histoire de la race à laquelle il est emprunté. Mais on peut dire que le vague convient précisement à un pays où tant de races se trouvent juxtapposées. L'expression Thraco-illyrienne est loin de les embrasser toutes.

Je dois avouer toutefois que le mot pélasgique n'a pas fait fortune. Peu de géographes l'ont adopté en France.

E. LEVASSEUR.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1904-1905.

Special Meeting, November 7, 1904, *in the Royal Albert Hall.*—Sir CLEMENTS MARKHAM, K.C.B., President, in the Chair.

ELECTIONS.—*Hon. E. Coke; Rev. William G. Donaldson; Charles Turville Gardner; Russell Davis Gillman; John Henderson; Charles Percy Perry; Robert L. Reid; John B. Sainsbury; Captain P. H. Short (Gloucester Regt.); H. R. Stephenson; Gordon le Suer; Thomas James Thomas; Andrew Peter William Williamson; Arthur Dudley Yorke.*

The paper read was:—

"The Work of the National Antarctic Expedition." By Captain R. F. Scott, C.V.O., R.N.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Col. = Colonies.
Com. = Commerce.
C. R. = Comptes Rendus.
E. = Erdkunde.
G. = Geography, Géographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
Jb. = Jahrbuch.
k. u. k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. (mém.) = Memoirs, Mémoires.
Met. (mét.) = Meteorological, etc.
P. = Proceedings.
R. = Royal.
Rev. (Riv.) = Review, Revue, Rivista.
S. = Society, Société, Selskab.
Sc. = Science(s).
Sitzb. = Sitzungsbericht.
T. = Transactions.
Ts. = Tijdschrift, Tidskrift.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Alps. **Penck and Brückner.**

Die Alpen im Eiszeitalter. Von Dr. A. Penck und Dr. E. Brückner. Lieferung 6. Leipzig: C. H. Tauchnitz, 1904. Size 10½ × 7½, pp. 545–656. *Map and Illustrations. Presented by the Publisher.*

Austria. *M.k.k.G. Ges. Wien* **47** (1904): 91–95. **Schaffer.**

Zur Frage der alten Flussterrassen in Wien. Von Dr. F. X. Schaffer.

Noticed in the Monthly Record (*ante*, p. 673).

Austria—Geodesy.

Publikationen für die Internationale Erdmessung. Die Astronomisch-Geodätischen Arbeiten des K. und K. Militär-Geographischen Institutes in Wien. XX. Band. Astronomische Arbeiten. 8. Polhöhen und Azimuth-Messungen auf den Stationen Arber, Böhmerwall, Hora, Kohout, Kubány, Markstein (nur Polhöhe), Maydenberg, Predigstuhl (nur Polhöhe), Schöninger (nur Polhöhe), Spittlmais und Viehberg. Herausgegeben vom K. und K. Militär-Geographischen Institute. Wien, 1903. Size 12 × 9½, pp. vi. and 194. *Presented by the K. u. K. Militär-Geogr. Institut.*

Austria—Lissa. *B.S.G. Italiana* **5** (1904): 423–447, 530–550. **Martelli.**

Osservazioni geografico-fisiche e geologiche sull' isola di Lissa. Del dott. A. Martelli. *With Map.*

Balkan Peninsula. **Cvijić.**

Die Tektonik der Balkanhalbinsel mit besonderer Berücksichtigung der neueren Fortschritte in der Kenntnis der Geologie von Bulgarien, Serbien und Makedonien. Von J. Cvijić. Wien, 1904. Size 10 × 7½, pp. 347–370. *Map.*

Balkan Peninsula. *G. Anzeiger* **5** (1904): 123–127. **Stavenhagen.**

Die Kartographie der Balkanhalbinsel im XIX. Jahrhundert. Von W. Stavenhagen.

Europe—Health Resorts. **Linn.**

The Health Resorts of Europe. A Medical Guide to the Mineral Springs, Climatic Mountain and Seaside Health Resorts, Milk, Whey, Grape, Earth, Mud, Sand, and Air Cures of Europe. By Dr. T. Linn. Twelfth Edition. London: The Health Resorts Bureau, 1904. Size 7 × 5, pp. 258. *Presented by the Health Resorts Bureau.*

France. *C. Rd.* **139** (1904): 179–181. **Gosselet.**

Cartes hypsométriques des assises crétaciques dans le nord de la France. Région de Douai. Note de J. Gosselet.

France—Corsica. *Geolog. Mag.* **1** (1904): 388–392. **Bonney.**

Some Eroded Rocks in Corsica. By Prof. T. G. Bonney, D.Sc. *With Plate.*

France—Corsica. **Le Bondidier.**

B.S.G. de l'Est **24** (1903): 307–328, 404–428; **25** (1904): 29–40.

En Corse. Carnet de route. Par L. Le Bondidier.

France—Rhone, etc. *B.S.G. Lyon* **19** (1904): 97–126. **Turquan.**
Géographie agricole, industrielle, commerciale et économique du département du Rhône et régions environnantes. Par V. Turquan. *With Maps.*

Germany. *G.Z.* **10** (1904): 279–280. **Günther.**
Seeschwankungen (Seiches) am Chiemsee. Von Prof. Dr. S. Günther.

Germany. **Linde.**
Die Lüneburger Heide. Von Dr. R. Linde. (Land und Leute . . . herausgegeben von A. Scobel, xviii.) Bielefeld und Leipzig: Velhagen and Klasing, 1904. Size 10 × 7, pp. 150. *Map and Illustrations.*

Germany. *Notizbl. V. Erdk. Darmstadt* (IV. F.) **24** (1903): 17–37. **Steuer.**
Geologische Beobachtungen im Gebiet der alten Mündungen von Main und Neckar in den Rhein. Von A. Steuer. *With Plate.*

Germany—Erzgebirge. **Rathsburg.**
Geomorphologie des Flöhagebietes im Erzgebirge. Von Dr. A. Rathsburg. (Forschungen zur deutschen Landes- und Volkskunde . . . herausgegeben von Dr. A. Kirchhoff. XV. Band, Heft 5.) Stuttgart: J. Engelhorn, 1904. Size 9½ × 6½, pp. 347–541. *Maps.*

Germany—Fishing Trade. **Oliver.**
Fishing Trade of the Weser Seaports. Foreign office, Miscellaneous, No. 616, 1904. Size 9½ × 6½, pp. 12. *Price* 1*d.*

Germany—Historical. *Globus* **86** (1904): 37–41. **Binzer.**
Die Römerwege zwischen der Unterweser und der Niederelbe und die mutmasslichen Ankerplätze des Tiberius im Jahre 5 n. Chr. Von C. A. L. v. Binzer.

Germany—Ice Conditions. *Ann. Hydrographie* **32** (1904): 401–407. ——
Die Eisverhältnisse an den deutschen Küsten im Winter 1903–04. *With Diagram.*

Germany—Oder. *G.Z.* **10** (1904): 316–332. **Fischer.**
Entstehung und Verlauf des Oderhochwassers im Juli 1903. Nach einem Vortrage im Berliner Zweigverein der deutschen meteorologischen Gesellschaft. Von Dr. K. Fischer. *With Diagrams.*

Iceland. **Hann.**
Die Anomalien der Witterung auf Island in dem Zeitraume 1851 bis 1900 und deren Beziehungen zu den gleichzeitigen Witterungsanomalien in Nordwesteuropa. Von J. Hann. (Aus den Sitzungsberichten der K. Akad. der Wissenschaften in Wien. Mathem.-naturw. Klasse, Bd. cxiii. Abt. IIa. Jänner, 1904.) Size 10 × 6½, pp. 88. *Presented by the Author.* [Noticed *ante*, p. 673.]

Iceland. *G. Tidskrift* **17** (1903–1904): 181–186. **Thoroddsen.**
En Udflugt til Vulkanen Skjaldbreid paa Island. Af Prof. Dr. T. Thoroddsen.

Italy. *Quarterly J. Geolog. S.* **60** (1904): 296–315. **Lorenzo.**
The History of Volcanic Action in the Phlegræan Fields. By Prof. G. de Lorenzo. *With Maps and Sections.*

Italy—Apennines. *Riv. G. Italiana* **11** (1904): 305–319. **Grasso.**
Per la storia della conoscenza dell' Apennino. Di G. Grasso.

Italy—Historical. *Riv. G. Italiana* **11** (1904): 1–12, 136–145, 226–236. **Marinelli.**
Giovanni Targioni Tozzetti e la illustrazione geografica della Toscana. Communicazione di O. Marinelli.

Dwells on the importance of Targioni's contributions to a geographical knowledge of Tuscany in the eighteenth century.

Italy—Piedmont. *Riv. G. Italiana* **11** (1904): 184–187. **Dainelli.**
Le isole linguistiche tedesche in Piemonte. G. Dainelli.

Mediterranean—Winter Resorts. **Reynolds-Ball.**
Mediterranean Winter Resorts. By E. A. Reynolds-Ball. Fifth Edition. London: Hazell, Watson & Viney, 1904. Size 7 × 4½, pp. xxvii. and 618. *Maps and Plans. Price* 6*s. Presented by the Publishers.*

The new edition of this well-known and useful guide has been still further enlarged, both by additional details throughout and by sections dealing with places not hitherto touched upon, *e.g.* Cyprus and Khartum. Its handy form is, however, preserved by the use of specially thin but tough paper.

Meuse. *Mém. Couronnés, etc., A.R. Belgique* **62** (6), (1904): pp. 30. **Vanhove.**
Étude pluviométrique sur le bassin de la Meuse. Par D. Vanhove. *With Map.*

North Sea—Coasts. **Warming.**
Mém. A.R. Sci., etc., Danemark **2** (No. 1) (1904): pp. 56.
Bidrag til Vadernes, Sandenes og Marskens Naturhistorie. Af Dr. E. Warming. Under medarbejde af Dr. Wesenberg-Lund, E. Østrup og fl. Avec un *Résumé* en Français. *With Map and Illustrations.*
On sand and mud banks on the coasts of the North sea, and the animal and vegetable life associated with them.

Norway—Glommen. *G.Z.* **10** (1904): 277–279. **Reusch.**
Das Knie des Glommenflusses in Norwegen. Von Dr. H. Reusch. *With Map.*

Norway—Tides. ——
Resultater af Vandstands-Observationer paa den Norske Kyst. Hefte vi. (Udgivet af den Norske Gradmaalings-Kommission.) Kristiania: W. C. Fabritius & Sønner a/s., 1904. Size 12 × 9½, pp. 60. *Diagrams.*

Norway and Sweden—Glommen. *Ymer* **24** (1904): 226–229. **Reusch.**
Glommen til Sverige? Af H. Reusch.
On a possible diversion of the course of the Glommen from Norway to Sweden.

Pyrenees. *A travers le Monde, Tour du Monde* **10** (1904): 285. ——
Projet de trois nouvelles Voies ferrées à travers les Pyrénées. *With Map.*
See note in Monthly Record for November (p. 585).

Rumania. *C. Rd.* **139** (1904): 226–227. **Martonne.**
Sur les terrasses des rivières karpatiques en Roumanie. Note de E. de Martonne.

Rumania. *C. Rd.* **139** (1904): 316–318. **Martonne.**
Sur l'évolution de la zone des dépressions subkarpatiques en Roumanie. Note de E. de Martonne.

Spain—Bilbao. *Deutsch. Rundschau G.* **26** (1904): 450–452. **Nebehay.**
Bilbao als Zukunftshafen. Von Karl Nebehay. *With Illustration.*

Sweden. *Ymer* **24** (1904): 180–186. **Wiklund.**
Namnet Luleå och de forna nationalitetsförhållandena i Norrbotten. Af K. B. Wiklund.
On the name Luleå and former political relations in Norbotten.

Sweden—Plankton. **Lemmermann.**
Arkiv Botanik, K. Svensk Vet.-A. **2** (No. 2) (1904): pp. 210.
Das Plankton schwedischer Gewässer. Von E. Lemmermann. *With Plates.*

Switzerland. **Vincent.**
Switzerland at the beginning of the Sixteenth Century. By J. M. Vincent. (Johns Hopkins University Studies. Series xxii. No. 5.) Baltimore, 1904. Size 10 × 6, pp. 62.

Switzerland. **Weber.**
Beiträge zur geologischen Karte der Schweiz, herausgegeben von der Geologischen Kommission der Schweiz. Naturforschenden Gesellschaft auf Kosten der Eidgenossenschaft. Neue Folge, xiv. Lieferung. Des ganzen Werkes 44. Lieferung. Ueber den Kali- Syenit des Piz Giuf und Umgebung (östliches Aarmassiv) und seine Ganggefolgschaft. Von Dr. F. Weber. Bern: A. Francke, 1904. Size 12½ × 9½, pp. x. and 182. *Maps and Plates. Price* 10*f. Presented by the Publisher.*

Switzerland—Bernese Oberland. **Wäber.**
Jahrb. Schweiz. Alpenclub **39** (1903–1904): 212–261.
Zur Geschichte des Fremdenverkehrs im engeren Berner Oberlande. 1763–1835. Von A. Wäber. *With Illustrations.*

Switzerland—Lake of Geneva. *Quarterly J. Geolog. S.* **60** (1904): 316–318. **Preller.**
Phenomena bearing upon the Age of the Lake of Geneva. By C. S. Du Riche Preller. [Abstract.]

United Kingdom—Ireland. *Blackwood's Mag.* **176** (1904): 313–328. **Gwynn.**
From Tory to Aran. By S. Gwynn.
On a recent cruise which enabled the writer to study the work of the Congested Districts Board.

United Kingdom—Rainfall. **Mill.**

British Rainfall, 1903. On the Distribution of Rain over the British Isles, during the year 1903, as observed at nearly 4000 stations in Great Britain and Ireland, with articles upon various branches of Rainfall work. Compiled by Dr. H. R. Mill. London: E. Stanford, 1904. Size 9 × 6, pp. 68 and 300. *Frontispiece, Maps, and Diagrams. Price* 10*s. Presented by the Compiler.*

Some new features have been added in this volume (the first for which Dr. Mill takes the entire responsibility), rendering it still more valuable than hitherto to those interested in rainfall matters. Special mention should be made of the improvement of the maps and the addition of those illustrating remarkable cases of heavy and widespread rainfalls.

United Kingdom—Suffolk. *Geolog. Mag.* **1** (1904): 502–504. **Spiller.**

Recent Coast Erosion in Suffolk: Dunwich to Covehithe. By J. Spiller.

United Kingdom—Teign. **Jukes-Browne.**

Quarterly J. Geolog. S. **60** (1904): 319–334.

The Valley of the Teign. By A. J. Jukes-Browne. *With Maps.*

Cf. note in *Journal* for May, 1904 (p. 679).

United Kingdom—Wales. **Strahan, Gibson, and Cantrill.**

Memoirs of the Geological Survey, England and Wales. The Geology of the South Wales Coal-Field. Part v. The Country around Merthyr Tydfil, being an account of the region comprised in Sheet 231 of the Map. By A. Strahan, W. Gibson, and T. C. Cantrill. London: E. Stanford, 1904. Size 10 × 6½, pp. viii. and 132. *Maps and Sections. Price* 1*s.* 6*d.*

ASIA.

Armenia—Place-names. **Hübschmann.**

Die altarmenischen Ortsnamen. Mit Beiträgen zur historischen Topographie Armeniens. Von H. Hübschmann. (Sonderabdruck aus dem 16 Bande der Indogermanischen Forschungen von K. Brugmann und W. Streitberg.) Strassburg: K. J. Trübner, 1904. Size 9 × 6, pp. 197–490. *Map. Price* 8*s.*

Asia. **Ronaldshay.**

On the Outskirts of Empire in Asia. By the Earl of Ronaldshay. Edinburgh and London: W. Blackwood & Sons, 1904. Size 9½ × 7, pp. xxii. and 408. *Maps and Illustrations. Price* 21*s. net. Presented by the Publishers.*

An attempt "to place before the public an account of some of the less accessible countries of Asia, and of the problems to which their existence and present position give rise." The author's route led through Turkey, Persia, Russian Central Asia, Siberia, Manchuria, and Japan.

Cambodia. *B. Économique (Indo-Chine)* **7** (1904): 375–379. **Achard.**

Note sur les terres riveraines du Mékong, au Cambodge. Par E. L. Achard.

Central Asia. **Younghusband.**

The Heart of a Continent. A Narrative of Travels in Manchuria, across the Gobi Desert, through the Himalayas, the Pamirs, and Hunza. 1884–1894. By Colonel F. E. Younghusband. [Fourth Edition.] London: John Murray, 1904. Size 9 × 6, pp. xviii. and 332. *Map and Illustrations. Price* 6*s. net. Presented by the Publisher.*

Mr. Murray has done good service by supplying the public with a new edition of this well-known work at a moderate price. The get-up is excellent.

Ceylon. **Grinlinton.**

Ceylon: Administration Reports, 1903. Part ii.—Scientific Survey Department. Report of Mr. F. H. Grinlinton, C.M.G., Surveyor-General. Size 13½ × 8½, pp. 32. *Portrait, Map, and Plans. Presented by the Surveyor-General of Ceylon.*

China. *B. Comité l'Asie Française* **4** (1904): 266–272. **Grillières.**

Réception du lieutenant Grillières. *With Map.*

Lieut.-Grillières has lately made a journey of exploration in Yunnan and on the Tibetan border.

China—Geology. *Asien* **8** (1904): 52–55, 91–94. **Tiessen.**

Die Grundzüge des Gebirgsbaues und die Bodenschätze Chinas. Von Dr. E. Tiessen.

China—Sechuan. *Scottish G. Mag.* **20** (1904): 393–403. **Little.**

The Irrigation of the Chentu Plateau. By A. Little. *With Maps and Illustrations.*

China—Shantung. *B. Comité l'Asie Française* **4** (1904): 331–336. **Pila.**

Une province Chinoise en progrès: le Chantoung. Par F. Pila.

China—Weihaiwei. ———

Weihaiwei. Report for 1903. Colonial Reports, Annual No. 419, 1904. Size 10 × 6, pp. 60. *Price* 3*d.*

Chinese Empire—Tibet. *Nineteenth Century* **56** (1904): 113–118. **Boulger.**

The Capture of Lhasa in 1710. By D. C. Boulger.

On the taking of Lhasa by the Eleuths.

Chinese Empire—Tibet. *Imp. and Asiatic Quarterly Rev.* **18** (1904): 28–43. **Bruce.**

Our Relations with Tibet. By Captain G. E. Bruce.

Chinese Empire—Tibet. *Monthly Rev.* **16** (1904): 60–82. **Reid.**

What I saw in Thibet. By W. C. Jameson Reid.

It is difficult to form an opinion whether this describes an actual journey, or whether the intention is merely to present a picture of Tibetan characteristics in the form of an imaginary narrative of travel. The writer's qualifications may be doubted when we read of the Yangtse having its source in the Koko nor!

Chinese Empire—Tibet. *Fortnightly Rev.* **76** (1904): 124–134. **Parker.**

The Bottom-rock of the Tibet Question. By E. H. Parker.

Eastern Asia. **Douglas.**

Europe and the Far East. By Sir Robert K. Douglas. Cambridge: The University Press, 1904. Size 8 × 5¼, pp. viii. and 450. *Maps. Price* 7*s.* 6*d. Presented by the Publishers.*

A valuable summary, suitable for general readers, of the relations between European powers and the Eastern empires, especially during the last century. The earlier attempts to open up intercourse are very briefly touched upon, and no mention is made of the earliest French trading ventures at the close of the seventeenth century.

India—Hyderabad. **McAuliffe.**

The Nizam; the Origin and Future of the Hyderabad State, being the Le Bas Prize Essay in the University of Cambridge, 1904, by R. P. McAuliffe. London: C. J. Clay & Sons, 1904. Size 8 × 5¼, pp. xii. and 86. *Price* 2*s.* 6*d. net. Presented by the Author.*

The writer has selected from the mass of historical facts available those which throw light on the still unfinished evolution of the state through centuries of political consolidation.

India—Spiti. *Mem. Geolog. Surv. India* **36** (Pt. i.) (1904): pp. 130 and vi. **Hayden.**

The Geology of Spiti, with parts of Bashahr and Rupshu. By H. H. Hayden. *With Map and Plates.*

India—Surveys. **Gore.**

Extracts from Narrative Reports of the Survey of India for the season 1901–1902. Prepared under the direction of Colonel St. G. C. Gore, C.S.I., Calcutta, 1904. Size 13 × 8½, pp. 58. *Presented by the Surveyor-General of India.*

Japan. *Imp. and Asiatic Quarterly Rev.* **18** (1904): 140–155. **Parker.**

The Attempt made by Kublai Khan to Conquer Japan. By E. H. Parker. *With Map.*

Japan—Formosa. *Meteorolog. Z.* **21** (1904): 383–387. **Hann.**

Klima von Formosa (Taiwan). Von J. Hann.

Japan—Historical. **Haas.**

Geschichte des Christentums in Japan. Von Pfarrer Dr. H. Haas. II. Fortschritte des Christentums unter dem Superiorat des P. Cosmo de Torres. (Supplement der Mitteilungen der Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens.) Tokyo, 1904. Size 9½ × 6¼, pp. xxviii. and 384. *Presented by the Deutsche Gesellschaft für Natur- und Völkerkunde Ostasiens.*

Korea. **Bourdaret.**

Émile Bourdaret. En Corée. Paris: Plon-Nourrit et Cie., 1904. Size 7½ × 5, pp. 364. *Illustrations. Price* 3*s.*

An account of recent journeys in Korea, for the most part by well-known routes,

but useful as a contribution to further knowledge of a country now attracting public attention.

Malay Archipelago—Sumatra. ——

Bijd. Taal-, Land- en Volkenk. Ned.-Indië **2** (1904): 548–557.

Korte beschrijving van het landschap Bila. *With Map.*

Malay Peninsula. *Scottish G. Mag.* **20** (1904): 337–348. **Annandale.**

The Peoples of the Malay Peninsula. By Nelson Annandale. *With Illustrations.*

Malay Peninsula. **Annandale and Robinson.**

Fasciculi Malayenses. Anthropological and Zoological Results of an Expedition to Perak and the Siamese Malay States, 1901–1902. Undertaken by N. Annandale and H. C. Robinson. Anthropology. Part IIa. London: Williams & Norgate, 1904. Size 10½ × 8, pp. 116. *Illustrations. Price* 10*s. net. Presented.*

Malay States. **Belfield.**

Handbook of the Federated Malay States. Compiled by H. C. Belfield. Second Edition. London: E. Stanford, [1904]. Size 8½ × 5½, pp. 174. *Maps and Illustrations. Price* 2*s.* 6*d. Presented by the Publisher.*

Gives the most complete information to be found, in equally small compass, on the Federated Malay States and their economic resources. The statistics in this edition have been brought down to the end of 1902.

Pamirs. **Olufsen.**

Through the Unknown Pamirs. The Second Danish Pamir Expedition 1898–99. By O. Olufsen. London: W. Heinemann, 1904. Size 9 × 6, pp. xxii. and 238. *Maps and Illustrations. Price* 15*s. net. Presented by the Author.*

A distinct addition to our knowledge of the Pamirs. Instead of a mere narrative of travel, it presents the results of the author's and his companions' observations in a series of chapters dealing with different aspects of the country and its inhabitants.

Persia. **Morgan.**

Mission scientifique en Perse. Par J. de Morgan. Tome v. Études linguistiques, dialectes Kurdes, langues et dialectes du nord de la Perse. Paris: E. Leroux, 1904. Size 11½ × 9, pp. xvi. and 326. *Map.*

Persia. *Scottish G. Mag.* **20** (1904): 403–415. **Sykes.**

Life and Travel in Persia. By Miss E. Sykes.

Philippine Islands. *Contemporary Rev.* **86** (1904): 392–404. **Foreman.**

The Americans in the Philippines. By J. Foreman.

Philippine Islands. ——

Population of the Philippines. (Census of the Philippine Islands: 1903. Bulletin 1.) Department of Commerce and Labor, Bureau of the Census, 1904. Size 9 × 6, pp. 100.

See note in the October number (p. 480).

Philippine Islands. *Imp. and Asiatic Quarterly Rev.* **18** (1904): 130–139. **Steuart.**

The English in the Philippines. By A. F. Steuart.

Refers to the English occupation of Manila, 1762–64.

Philippine Islands—Climate. **Algué.**

The Climate of the Philippines. By Rev. J. Algué, S.J. (Census of the Philippine Islands, 1903. Bulletin 2.) Department of Commerce and Labor, Bureau of the Census, 1904. Size 9 × 6, pp. 104. *Maps and Diagrams.*

Philippine Islands—Volcanoes. **Masó.**

Volcanoes and Seismic Centers of the Philippine Archipelago. By Rev. M. Saderra Masó, S.J. (Census of the Philippine Islands, Bulletin 3.) Department of Commerce and Labor, Bureau of the Census, 1904. Size 9 × 6, pp. 80. *Maps and Illustrations.*

Russia—Caucasus. *B. American G.S.* **36** (1904): 327–341. **Hovey.**

Southern Russia and the Caucasus Mountains. By E. O. Hovey.

Notes collected during the excursion of the International Geological Congress in 1897.

Russia—Caucasus. *La G., B.S.G. Paris* **10** (1904): 65–68. **Martel.**

Mission Scientifique au Caucase Occidental, par M. E. A. Martel. Par F. Lemoine.

Russian Central Asia. *M.G. Ges. Hamburg* **20** (1904): pp. 312. **Friederichsen.**

Forschungsreise in den Zentralen Tiënschan und Dsungarischen Ala-tau (Russisch Zentral-Asien) im Sommer 1902. Von Dr. M. Friederichsen. *With Maps and Illustrations.* [To be reviewed.]

Straits Settlements. **Ireland.**

Studies in Colonial Administration VII. The Straits Settlements. By A. Ireland. (From the *Outlook*, May 14, 1904, pp. 122-126.) New York. Size 10 × 6¾. *Presented by the Author.*

Syria—Palestine. **Macgregor.**

The *Rob Roy* on the Jordan. A Canoe Cruise in Palestine, Egypt, and the Waters of Damascus. By John Macgregor, M.A. [Eighth Edition.] London: John Murray, 1904. Size 8 × 5½, pp. xiv. and 428. *Maps and Illustrations. Price* 2*s.* 6*d. net. Presented by the Publisher.*

This is a welcome addition to the number of famous books of travel at popular prices. Both the type and paper and general get-up of the volume are alike good.

Turkey—Arabia. *Nineteenth Century* **56** (1904): 251-261. **Bacon.**

To explore Arabia by Balloon. By the Rev. J. M. Bacon.

Turkey—Arabia. *M.K.K.G. Ges. Wien* **47** (1904): 47-55. ———

Die Hedjaz-Eisenbahn.

AFRICA.

Algeria. **Lartigue.**

Monographie de l'Aurès. Par le Lieut.-Colonel de Lartigue. Constantine, 1904. Size 10 × 6½, pp. x. and 492. *Illustrations. Price* 13*s.* 6*d.*

An excellent piece of regional geography.

Central Africa. *Globus* **86** (1904): 5-13, 73-79. **Senftenberg.**

Zwei Reisen durch Ruanda 1902 bis 1903. Aus Tagebüchern, Briefen und hinterlassenen Papieren des Oberleutnants F. R. von Parish zusammengestellt von Oscar Freiherr Parish von Senftenberg. *With Map and Illustrations.*

Noticed in the Monthly Record, *ante*, p. 678.

Congo State. **Marès.**

Roland De Marès. The Congo. Brussels: J. Lebègue & Co., [1904]. Size 9 × 6, pp. 118.

A reply to criticisms of the State methods.

Congo State—Katanga. *B.S. d'Études Colon.* **11** (1904): 576-600. **Tonneau.**

Le Katanga. Par E. Tonneau.

A general account of the operations of the Katanga Company, and the economic conditions of the country.

East Africa—Masai. **Merker.**

Die Masai. Ethnographische Monographie eines ostafrikanischen Semitenvolkes. Von M. Merker. Berlin: D. Reimer (Ernst Vohsen), 1904. Size 11 × 8, pp. xvi. and 422. *Map and Illustrations. Price* 8*m. Presented by the Publisher.*

The most thorough account of the Masai that has yet appeared. The author had many opportunities of becoming acquainted with the people when serving as an officer in the military forces of the German protectorate.

Egypt. *Scottish G. Mag.* **20** (1904): 318-354. **White.**

The Rehabilitation of Egypt. By A. S. White.

Egypt—Zoology. **Jägerskiöld.**

Results of the Swedish Zoological Expedition to Egypt and the White Nile, 1901, under the direction of L. A. Jägerskiöld. Part i. Uppsala: C. J. Lundström, 1904. Size 10 × 6½. *Illustrations. Presented by the Royal University of Uppsala.*

French Congo. *Mouvement G.* **21** (1904): 337-340. **Villelongue.**

L'entre-Ubangi-et-Sanga. Par P. de Villelongue. *With Map.*

Describes the exploration of the Motaba, a western tributary of the Ubangi.

French West Africa. *B.S.G. Marseille* **28** (1904): 43-54. **Barot.**

L'Afrique Occidentale française, son passé, son avenir, conférence du Docteur Barot. *With Map.*

German South-West Africa. *Deutsch. Kolonialzeitung* **21** (1904): 248. **Groll.**

Die Notwendigkeit einer Triangulation in Deutsch-Südwestafrika. Von M. Groll.

Gold Coast. *J. African S.* **3** (1904): 325–351. **Nathan.**

Dutch and English on the Gold Coast in the Eighteenth Century. By Major Sir M. Nathan.

Ivory Coast. **Croson-Duplessix.**

Renseignements Colon., Comité l'Afrique Française, No. 6. (1904): 152–156.

Notes Ethnographiques sur la Côte-d'Ivoire. Par Capitaine Croson-Duplessix.

Kamerun. *Globus* **86** (1904): 1–5. **Hutter.**

Völkergruppierung in Kamerun. Von Hauptmann a. D. Hutter. *With Map.*

Lagos, etc. *J. African S.* **3** (1904): 464–481. **MacGregor.**

Lagos, Abeokuta and the Alake. By Sir W. MacGregor.

Madagascar—Railway. *Rev. Madagascar* **6** (2) (1904): 28–37. **Delhorbe.**

Le chemin de fer de Madagascar. Par C. Delhorbe.

Morocco. *Fortnightly Rev.* **76** (1904): 423–436. **Bensusan.**

In Red Marrakesh. By S. L. Bensusan.

Mozambique. **Negreiros.**

Le Mozambique. Par A. Negreiros. Paris: A. Challamel, 1904. Size 7½ × 5½, pp. 198. *Map and Illustrations. Presented by the Author.*

Natal—Durban. **Henderson.**

Durban: Fifty Years' Municipal History. Compiled for the Durban Corporation in Celebration of the Jubilee of the Borough, by W. P. M. Henderson. Durban: Robinson & Co., 1904. Size 10 × 6½, pp. 394. *Illustrations. Presented by the Town Clerk, Durban.*

The history of Durban as a municipality dates from 1854.

Nigeria. **Hazzledine.**

The White Man in Nigeria. By G. D. Hazzledine. London: E. Arnold, 1904. Size 9 × 6, pp. xiv. and 228. *Map and Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

A thoughtful study of present conditions and future prospects in Nigeria. The author is sanguine as to the latter.

Nigeria. *Blackwood's Mag.* **176** (1904): 329–337. **Partridge.**

The Burial of the Atta of Igaraland, and the "Coronation" of his successor. By C. Partridge.

Nile. *B. American G.S.* **36** (1904); 346–352. **Chaillé-Long.**

Chaillé-Long's Work on the Nile. *With Map.*

The writer lays stress on the value of his work under Gordon on the Upper Nile, and protests against the disuse of the name Ibrahim given by him to Lake Choga.

North Africa. *C. Rd.* **138** (1904): 1629–1631. **Bureau.**

Le terrain houiller dans le nord de l'Afrique. Note de E. Bureau.

The proofs of the existence of carboniferous strata in North Africa, which have been slowly accumulating since Barth's time, have lately received a further addition through the investigations of Lieut. Poirmeur in south-west Algeria.

North Africa. **El-Hachaichi.**

Voyage au Pays des Senoussia à travers la Tripolitaine et les Pays Touareg. Par le Cheikh Mohammed ben Othmane El-Hachaichi traduit par V. Serres et Lasram. Paris: A. Challamel, 1903. Size 7½ × 5, pp. 316. *Portrait. Price* 3*s.*

This journey by an Arab sheikh was undertaken in 1896 at the instance of the Marquis de Mores, then setting out on his last ill-fated expedition. It led to the Senussi centre of Kufra, and is interesting from the information it gives of the position of the sect at that time, as well as of the northern Tuareg countries.

North and West Africa. *B.S. Languedoc. G.* **27** (1904): 131–143. **Bordier.**

La voie transafricaine de Tunisie à Loango par le Tchad. Par le Commandant Bordier.

On the need of opening a through route from north to south of French Africa.

Sahara. *C. Rd.* **138** (1904): 1527–1529. **Foureau.**

Découverte de gîtes fossilifères dans le Djoua, à l'est de Timassânine (Sahara). Note de F. Foureau. *With Map.*

Sahara. *C. Rd.* **138** (1904): 1529–1531. **Haug.**

Sur la faune des couches à *Ceratodus* crétacées du Djoua, près Timassânine (Sahara). Note de É. Haug.

Sahara. **Normand.**

Renseignements Colon., Comité l'Afrique Française, No. 7 (1904): 165–170.

Les Travaux de la vallée de la Zousfana. Par Capitaine R. Normand.

On works carried out since the French occupation.

Togo. *Deutsch Kolonialblatt* **15** (1904): 487–488. **Seefried.**

Bericht des Oberleutnants Freiherrn v. Seefried über die Untersuchung des Hahoflusses. *With Map.*

Tunis. *Questions Dipl. et Colon.* **18** (1904): 81–90. **Lorin.**

Études tunisiennes. L'évolution politique du protectorat. Par H. Lorin.

Tunis. ———

La Tunisie au début du XX^me^ siècle. Paris: F. R. de Rudeval, 1904. Size 10 × 6½, pp. viii. and 378. *Illustrations. Price* 12*s.* 6*d.*

This is produced on the same lines as the similar work on Madagascar which appeared in 1902. The separate monographs are by experts in their special subjects, and the work is the best account of Tunis for general reference that has yet appeared.

Uganda. ———

Africa, No. 11 (1904). Final Report of the Uganda Railway Committee. London: Eyre & Spottiswoode, 1904. Size 13½ × 8½, pp. 32. *Price* 4*d.*

Upper Nile Basin. **Garstin and Dupuis.**

Report upon the Basin of the Upper Nile, with proposals for the improvement of that river, by Sir W. Garstin, G.C.M.G., to which is attached a report upon Lake Tsana and the rivers of the Eastern Soudan by Mr. C. Dupuis. With Maps and Appendices. Cairo, 1904. Size 13½ × 9, pp. vi., 196, 56, and 42. *Maps and Illustrations.* [2 *copies.*] *Presented by the Survey Department, Cairo.*

To be reviewed.

West Africa. *B. Comité l'Afrique Française* **14** (1904): 228–229. **Maistre.**

A propos du Toubouri-Kabbi. Par C. Maistre.

Calls attention to Captain Loefler's part in the exploration of the Tuburi, which has been strangely left out of view by writers who have dealt with Captain Lenfant's recent expedition.

NORTH AMERICA.

Alaska. *B. United States Geolog. Surv., No.* 218 (1903): pp. 72. **Collier.**

The Coal Resources of the Yukon, Alaska. By A. J. Collier. *With Maps and Plates.*

Alaska—Lake Clark. *National G. Mag.* **15** (1904): 326–331. **Osgood.**

Lake Clark, a little-known Alaskan Lake. By W. H. Osgood. *With Map and Illustrations.*

Canada. *American J. Sci.* **18** (1904): 175–179. **Chalmers.**

The Geomorphic Origin and Development of the Raised Shore Lines of the St. Lawrence Valley and Great Lakes. By Dr. R. Chalmers.

Canada. *T.R.S. Canada* **9** (Sec. IV.) (1903): 143–147. **Poole.**

A Submerged Tributary to the Great Pre-Glacial River of the Gulf of St. Lawrence. By Dr. H. S. Poole. *With Map.*

Canada. ———

Annual Report of the Department of the Interior for the year 1902–1903. [Ottawa], 1904. Size 10 × 6½. *Illustrations.*

The report of the Surveyor-General states that sixty-six parties were at work in 1903. Among the special reports of geographical interest are those on surveys along the proposed route of the Canadian Northern Railway.

Canada—Bibliography. **Wrong and Langton.**

Review of Historical Publications relating to Canada. Edited by G. M. Wrong and H. H. Langton. Vol. viii. Publications of the year 1903. The University of Toronto, 1904. Size 11 × 7½, pp. xii. and 226.

Canada—British Columbia. **Mullins.**

The Stickeen River Country. By C. F. Mullins. Moose, Caribou and Big Horn Sheep Hunting in Cassiar District, B.C. (Reprinted from *Western Field*, February, March, and April, 1904.) Size 6 × 8, pp. 48. *Illustrations. Presented by the Author.*

Canada—British Columbia. ——

All-Canadian Railway to the North. Description of the Central Route *viâ* North Thompson Valley and Cariboo. Issued by the Inland Board of Trade, Kamloops, B.C. Size 8 × 6, pp. 12. *Presented by M. S. Wade, Esq.*

Canada—British Columbia. ——

The Great Interior of British Columbia. Description of a Portion of the Interior Valley to be traversed by the Boundary Kamloops and Cariboo Central Railway. (Reprinted from *Inland Sentinel*, Kamloops, B.C.) Size 8 × 6, pp. 8. *Presented by M. S. Wade, Esq.*

Canada—British Columbia—Lepidoptera. **Dyar.**

P. United States National Museum **27** (1904): 779–938.

The Lepidoptera of the Kootenai District of British Columbia. By H. G. Dyar.

Canada—Geological Survey. ——

Summary Report of the Geological Survey Department of Canada for the Calendar Year 1903. Ottawa, 1904. Size 10 × 6½, pp. 218. *Maps and Sections. Presented by the Geological Survey of Canada.*

Contains much information on the mineral resources of various parts of the Dominion, and reports on topographical surveying in Keewatin and elsewhere.

Canada—Turtle Mountain. *B. American G.S.* **36** (1904): 272–275. ——

The Great Landslide on Turtle Mountain. *With Illustrations.*

United States. **Baedeker.**

The United States, with an Excursion into Mexico. Handbook for Travellers by Karl Baedeker. Third Edition. Leipzig: K. Baedeker, 1904. Size 6½ × 4½, pp. civ. and 660. *Maps and Plans. Price* 12*m. Presented by the Publisher.*

Carefully brought up to date. The maps, which have been prepared under the supervision of Mr. Henry Gannett, include six, as well as eight plans, which now appear for the first time.

United States—Arizona. **Ransome.**

Geology of the Globe Copper District, Arizona. By F. L. Ransome. (United States Geological Survey, Professional Paper No. 12.) Washington, 1903. Size 11½ × 9, pp. 168. *Maps and Illustrations. Presented by the U.S. Geological Survey.*

United States—Arizona. **Ransome.**

The Geology and Ore Deposits of the Bisbee Quadrangle, Arizona. By F. L. Ransome. (United States Geological Survey, Professional Paper No. 21.) Washington, 1904. Size 11½ × 9, pp. 168. *Maps and Illustrations. Presented by the U.S. Geological Survey.*

United States—Census. ——

[Twelfth Census of the United States, 1900.] Special Reports. Occupations. Washington, 1904. Size 12 × 9½, pp. cclxvi. and 764. *Diagrams.*

United States—Clays. **Ries.**

The Clays of the United States, East of the Mississippi River. By H. Ries. (United States Geological Survey, Professional Paper, No. 11.) Washington, 1903. Size 11½ × 9, pp. 298. *Maps and Illustrations. Presented by the U.S. Geological Survey.*

United States—Climatology. *G. Teacher* **2** (1904): 212–218. **Ward.**

The Climatology of the United States: an Outline. By R. de C. Ward.

United States—Colorado. **Girty.**

The Carboniferous Formations and Faunas of Colorado. By G. H. Girty. (United States Geological Survey, Professional Paper No. 16.) Washington, 1903. Size 11½ × 9, pp. 546. *Plates. Presented by the U.S. Geological Survey.*

United States—Great Salt Lake. *Scottish G. Mag.* **20** (1904): 424–427. **Talmage.**

Salt Lake Water. By Prof. J. E. Talmage.

United States—Historical. **Gass and Hosmer.**

Gass's Journal of the Lewis and Clark Expedition. By Sergeant Patrick Gass,

one of the persons employed in the expedition. Reprinted from the edition of 1811, with facsimiles of the original title-page and the five original illustrations, a reproduction of a rare portrait of Gass, and a map of the Lewis and Clark route. With an analytical Index, and an Introduction by J. K. Hosmer, LL.D. Chicago: A. C. McClurg & Co., 1904. Size 8½ × 6½, pp. liv. and 298. *Price* $3.50 *net.*

Gass's journal is of value as supplying antindependent version of Lewis and Clark's great journey, supplementing and confirming the official narrative. The reprint is welcome, as the original is now scarce.

United States—Historical. **Lewis and Clark, and Wheeler.**

The Trail of Lewis and Clark, 1804–1904. A story of the great exploration across the continent in 1804–06; with a description of the old trail, based upon actual travel over it, and of the changes found a century later. By O. D. Wheeler. 2 vols. New York and London: G. P. Putnam's Sons, 1904. Size 8½ × 6, pp. (vol. i.) xxiv. and 378; (vol. ii.) xvi. and 420. *Maps and Illustrations. Price* 25*s. net.*

A very complete history of the organization and execution of Lewis and Clark's great enterprise, with elucidations from the writer's personal acquaintance with the route.

United States—Maine. *B. Geolog. S. America* **12** (1900): 433–448. **Tarr.**

Glaciation of Mount Ktaadn, Maine. By R. S. Tarr. *With Plates.*

United States—Massachusetts—Boston. ———

Engineering Department. List of Maps of Boston published between 1600 and 1903, copies of which are to be found in the possession of the City of Boston or other collectors of the same. Reprint of Appendix I., Annual Report of the City Engineer, February 1, 1903. Boston, 1903. Size 9 × 6, pp. 248. *Presented by the Engineering Department, Boston.*

United States—Massachusetts—Salem. **Rantoul.**

Essex I. Hist. Collections **40** (1904): 201–211.

The Date of the Founding of Salem. By R. S. Rantoul. *With Plate.*

United States—Michigan. *J. Geology* **12** (1904): 326–334. **Bowman.**

A typical case of Stream-capture in Michigan. By I. Bowman. *With Map and Illustrations.*

United States—Mississippi. *Popular Sci. Monthly* **65** (1904): 318–322. **Kingery.**

Saving the Mississippi's Source. By H. M. Kingery. *With Maps.*

Urges the need of saving the tract at the source of the Mississippi from the devastation caused by lumber-getting.

United States—Nebraska. **Darton.**

Preliminary Report on the Geology and Water Resources of Nebraska West of the One Hundred and Third Meridian. By N. H. Darton. (United States Geological Survey, Professional Paper No. 17.) Washington, 1903. Size 11½ × 9, pp. 70. *Maps and Illustrations. Presented by the U.S. Geological Survey.*

United States—Negroes. ———

Department of Commerce and Labour, Bureau of the Census. Bulletin 8. Negroes in the United States. Washington, 1904. Size 12 × 9, pp. 334. *Maps.*

United States—New York. *J. Geology* **12** (1904): 281–289. **Kindle.**

A series of gentle folds on the border of the Appalachian system. By E. M. Kindle. *With Map.*

United States—New York. *B. American G.S.* **36** (1904): 257–264. **Symons.**

The Projected New Barge Canal of the State of New York. By Colonel T. W. Symons. *With Map.*

United States—Washington. **Smith and Willis.**

Contributions to the Geology of Washington. Geology and Physiography of Central Washington, by G. O. Smith. Physiography and Deformation of the Wenatchee-Chelan District, Cascade Range, by B. Willis. (United States Geological Survey, Professional Paper No. 19.) Washington, 1903. Size 12 × 9, pp. 102. *Maps and Illustrations. Presented by the U.S. Geological Society.*

CENTRAL AND SOUTH AMERICA.

Argentine Republic. *An. Museo. Nac. Buenos Aires* **10** (1904): 1–15. **Outes.**

Arqueologia de Hucal (Gobernación de la Pampa). Por F. F. Outes. *With Illustrations.*

Argentine Republic and Bolivia. *Deutsch. Rundschau G.* **27** (1904) : 13–21. **Herrmann.**

Durch die Argentinische Puna zum Bolivianischen Chaco. Von W. Herrmann. *With Illustrations.*

Panama Canal. *G.Z.* **10** (1904) : 297–316. **Wegener.**

Der Panama-Kanal. Von Dr. G. Wegener.

South America—Historical. **Akers.**

A History of South America, 1854–1904. By C. E. Akers. London : John Murray, 1904. Size 9½ × 6, pp. xxviii. and 696. *Maps and Illustrations. Price* 21*s. net. Presented by the Publisher.*

The kaleidoscopic character of South American occurrences during the past half-century renders this attempt to summarize the history of the several states during that period a most useful undertaking, which the author appears to have carried out with success.

Venezuela. **Goiticoa.**

Venezuela : Geographical Sketch, Natural Resources, Laws, Economic Conditions, Actual Development, Prospects of Future Growth. Edited and compiled for the International Bureau of the American Republics by N. V. Goiticoa. 1904. Washington, 1904. Size 9 × 6, pp. 608. *Map and Illustrations. Presented by the Bureau.*

A useful and comprehensive summary of existing knowledge.

Venezuela—Historical. **Humbert.**

La Première occupation Allemande du Vénézuéla au XVI[e] siècle, période dite des Welser (1528–1556). Par J. Humbert. (Extrait du *Journal de la Société des Américanistes de Paris*, N.S. t. 1, No. 3.) 1904. Size 11½ × 8, pp. 14. *Plan.*

AUSTRALASIA AND PACIFIC ISLANDS.

Australasia. *Deutsch. Rundschau G.* **26** (1904) : 460–463. **Umlauft.**

Fortschritte der geographischen Forschungen und Reisen im Jahre 1903. 1. Australien und die Südsee. Von Dr. F. Umlauft.

German New Guinea. **Schnee.**

Bilder aus der Südsee. Unter den Kannibalischen Stämmen des Bismarck-Archipels. Von Dr. H. Schnee. Berlin : D. Reimer (Ernst Vohsen), 1904. Size 8½ × 6, pp. xiv. and 394. *Map and Illustrations. Price* 14*s.*

A valuable addition to our knowledge of German New Guinea and neighbouring islands, where the author held an official post for two years. He visited some little-known parts of the possession, including the Admiralty and St. Matthias islands, and here puts down his experiences and observations.

Marianne Islands—Guam. *B. American G.S.* **36** (1904) : 385–395. **Cox.**

The Island of Guam. By L. M. Cox. *With Map and Illustrations.*

Marshall Islands—Jaluit. *Globus* **85** (1904) : 329–333, 352–356, 363–367. **Schnee.**

Zur Geologie des Jaluit-Atolles. Von Dr. Schnee. *With Map and Illustrations.*

New Guinea—Dutch. **Dissel.**

Tijds. K. Ned. Aard. Genoots. Amsterdam **21** (1904) : 617–650.

Reis van Ati ati onin over Patipi en Degen naar Kajoni. Door J. S. A. van Dissel.

On a journey made in 1902 with a view to determining the limits of the Kapau-Papuan language, and to the study of the colonists from Ceram settled for two centuries in Western New Guinea.

New South Wales—Fisheries.

Fisheries of New South Wales. Annual Report for 1902. II. Fisheries Investigations and Fish Culture. [Sydney, 1904.] Size 13 × 8½, pp. 44. *Map, Diagrams, and Illustrations.*

Solomon Islands. **Ribbe.**

Zwei Jahre unter den Kannibalen der Salomo-Inseln. Reiseerlebnisse und Schilderungen von Land und Leuten. Von Carl Ribbe. Dresden-Blasewitz : H. Beyer, 1903. Size 10½ × 7, pp. viii. and 352. *Maps and Illustrations. Price* 10*s.* 6*d.*

Contains some valuable information on one of the least-known parts of the Pacific. About 150 pages deal with the Shortland islands, of the natives of which the author gives the fullest account that has yet appeared.

Tobi Island. *Globus* **86** (1904): 13–15. **Seidel.**

Tobi in Westmikronesien, eine deutsche Insel mit acht Namen. Von H. Seidel.

Victoria. **Turner.**

A History of the Colony of Victoria from its Discovery to its absorption into the Commonwealth of Australia. By H. G. Turner. 2 vols. London: Longmans & Co., 1904. Size 9 × 6, pp. (vol. i.) xvi. and 396; (vol. ii.) x. and 390. *Map and Plan. Price* 21*s. Presented by the Publishers.*

Valuable as an attempt to present the annals of Victoria by one who has lived half a century in the colony, and has taken great pains to obtain the testimony of authentic records, if not of the actors themselves, in the case of the earlier events.

POLAR REGIONS.

Franz Josef Island—Fossil Flora. **Laubach.**

K. Svensk. Vet.-A. Handl. **37** (No. 7) (1904): pp. 16.

Die strukturbietenden Pflanzengesteine von Franz Josef Land. Von H. Grafen zu Solms Laubach. *With Plates.*

MATHEMATICAL GEOGRAPHY.

Cartography—Projection. *Petermanns M.* **50** (1904): 155–159. **Van der Grinten.**

Darstellung der ganzen Erdoberfläche auf einer Kreisförmigen Projektionsebene. Von A. J. van der Grinten. *With Maps.*

Describes a useful projection by which the general relations of the continents and oceans can be well shown in a single plane map. While avoiding the great exaggeration of the north and south caused by Mercator's projection, it does not entirely avoid it. Thus Greenland appears nearly as large as South America (see *ante*, p. 670).

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Earthquakes. **Dutton.**

Earthquakes, in the Light of the New Seismology. By C. E. Dutton. London: J. Murray, 1904. Size 8½ × 6, pp. xxiv. and 314. *Maps and Illustrations. Price* 6*s. net. Presented by the Publisher.* [To be reviewed.]

Geophysics. *Geolog. Mag.* **1** (1904): 495–497. **Fisher.**

On the Cause of Compression of the Earth's Crust. By the Rev. O. Fisher.

Hydrography. **Murphy, Hoyt, and Hollister.**

Hydrographic Manual of the United States Geological Survey. Prepared by E. C. Murphy, J. C. Hoyt, and G. B. Hollister. (United States Geological Survey, Water-supply and Irrigation Paper No. 94.) Washington, 1904. Size 9½ × 6, pp. 76. *Presented by the U.S. Geological Survey.*

Hydrology. *Monthly Weather Rev.* **32** (1904): 176–177. **Loveland.**

Increased flow of spring water in the autumn. By G. A. Loveland.

Meteorology—Dust-fall. **Meinardus.**

Ueber einige bemerkenswerte Staubfälle der letzten Zeit. Von Dr. W. Meinardus. (Sonder-Abdruck aus "Das Wetter," Heft 12, 1903.) Size 9½ × 6½, pp. 16. *Presented by the Author.*

Meteorology—Pressure. *Meteorolog. Z.* **21** (1904): 345–357. **Ekholm.**

Wetterkarten der Luftdruckschwankungen. Von N. Ekholm. *With Diagrams.*

Meteorology—Pressure. *P.R.S.* **73** (1904): 457–470. **Lockyer.**

The Behaviour of the Short-Period Atmospheric Pressure Variation over the Earth's Surface. By Sir N. Lockyer, K.C.B., etc., and W. J. S. Lockyer. *With Diagrams.*

Meteorology—Winds. **Marchi.**

Atti R.A. Lincei, Rendiconti **13** (1 Sem.) (1904): 619–626.

La circolazione atmosferica negli strati inferiori. Nota di L. De Marchi.

Meteorology—Winds. *P.R.S.* **74** (1904): 20–30. **Shaw.**

On the General Circulation of the Atmosphere in Middle and Higher Latitudes. By W. N. Shaw, F.R.S. *With Diagrams.*

Meteorology—Winds. *Ann. Hydrographie* **32** (1904): 408–415. **Wegemann.**

Erweiterung des barischen Windgesetzes nebst Anwendungen. Von Dr. Wegemann. *With Diagram.*

Oceanography. **Macallum.**
University of Toronto Studies, Physiolog. Ser., No. 5 (1904): pp. 30.
The Palæochemistry of the Ocean in relation to Animal and Vegetable Protoplasm. By A. B. Macallum.

Oceanography. *Naturw. Wochenschrift* 3 (1904): 705–713. **Schütt.**
Kosmologie als Ziel der Meeresforschung. Von Prof. Dr. F. Schütt.

Oceanography—Azores. *C. Rd.* 138 (1904): 1643–1644. **Thoulet.**
Océanographie de la région des Açores. Note de M. Thoulet.

Oceanography—Azores. *C. Rd.* 139 (1904): 241–243. **Thoulet.**
La fosse de l'Hirondelle, dans l'Archipel des Açores. Note de M. Thoulet. *With Illustration.*
Results of observations during the latest cruise of the Prince of Monaco.

Oceanography—Pacific Ocean. *Science* 20 (1904): 338–341. **Bishop.**
The Cold-current System of the Pacific, and Source of the Pacific Coast Current. By Rev. S. E. Bishop. *With Diagram.*

Physiography. **Huxley and Gregory.**
Physiography, an Introduction to the Study of Nature. By T. H. Huxley. Revised and partly rewritten by R. A. Gregory. London: Macmillan & Co., 1904. Size 7 × 5, pp. xii. and 424. *Illustrations. Price* 4*s.* 6*d. Presented by the Publishers.* [To be reviewed.]

Ripple-marks. *Geolog. Mag.* 1 (1904): 410–418. **Hunt.**
The Descriptive Nomenclature of Ripple-mark. By A. R. Hunt.

Volcanoes. *Globus* 86 (1904): 182–185. **Krebs.**
Beziehungen des Meeres zum Vulkanismus. Von W. Krebs. II. Die Verbreitung der seebebenartigen Erscheinungen, mit besonderer Berücksichtigung der Erdbebenfluten. *With Maps.*

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Communications. *S.R. Belge G.* 28 (1904): 36–61, 110–132, 225–243. **Cammaerts.**
J. G. Kohl et la Géographie des Communications. Par Em. Cammaerts.
Traces the part played by Kohl in the evolution of the modern conception of geography as the study of the influence of environment.

Historical. *B.S.G. Lisboa* 22 (1904): 121–126. **Garofalo.**
I progressi delle conoscenze geografiche nell' età detta Ellenistica. Pelo Prof. F. P. Garofalo.

Historical—Cabot. *T.R.S. Canada* 9 (Sec. II.) (1903): 205–215. **Howley.**
Latest Lights on the Cabot Controversy. By Rt. Rev. Bishop M. F. Howley. *With Map.*

Historical Geography. **Götz.**
Historische Geographie, Beispiele und Grundlinien. Von Dr. W. Götz: (Die Erdkunde, herausgegeben von M. Klar. XIX. Teil.) Leipzig und Wien: F. Deuticke, 1904. Size 10¼ × 7, pp. x. and 294.
Rather a collection of object lessons than a complete treatise, as the only two groups of countries dealt with are those of the Mediterranean and Central Europe.

Negro Race. *J. African S.* 3 (1904): 398–404. **Johnston.**
A Negro Exodus. By A. Johnston.
On a possible return movement from the United States.

Political—Anglo-French Agreement. ——
Deutsch. Rundschau G. 26 (1904): 465–466.
Das Französisch-englische Abkommen vom 8. April, 1904. *With Map.*

BIOGRAPHY.

Celsius. *Deutsch. Rundschau G.* 26 (1904): 519–520. ——
Anders Celsius. *With Portrait.*

Norden. *London Topographical Record* **2** (1903): 42–65. **Wheatley.**

Notes upon Norden and his map of London, 1593. By Henry B. Wheatley, F.S.A. Reprinted from the *Transactions* of the New Shakespere Society.

Rasles. *T.R.S. Canada* **9** (Sec. I.) (1903): 117–134. **Dionne.**

Le Père Sébastien Rasles, jésuite, missionnaire chez les Abénaquis, 1657–1724. Par Dr. N. E. Dionne.

Ratzel. *B. American G.S.* **36** (1904): 550–553. **Genthe and Semple.**

Tributes to the Friedrich Ratzel. By Mrs. M. K. Genthe and Miss E. C. Semple. *With Portrait.*

GENERAL.

Bible Society.

After a Hundred Years. A Popular Illustrated Report of the British and Foreign Bible Society for the Centenary Year 1903–4. London: The Bible House, 1904. Size 8½ × 5½, pp. 124. *Illustrations. Presented by the British and Foreign Bible Society.*

Educational. *G. Anzeiger* **5** (1904): 150–153. **Schwarz.**

Die Ansichtskarte im Geographieunterricht. Von Dr. S. Schwarz.

Educational. **Gregory.**

The Teaching of Geography expanded from a Lecture by J. W. Gregory, D.SC., F.R.S. Melbourne: Whitcombe & Tombs, [1902]. Size 7½ × 5, pp. 50. *Illustration.*

Educational. *G. Teacher* **2** (1904): 191–197. **Mackinder.**

The Development of Geographical Teaching out of Nature Study. By H. J. Mackinder.

Educational—Textbook. **Dodge.**

Dodge's Elementary Geography. By R. E. Dodge. Chicago, etc.: Rand, McNally & Co., [1904]. Size 10 × 8½, pp. 232. *Maps and Illustrations. Presented by the Publishers.*

Education—Botanical Geography. *G. Teacher* **2** (1904): 201–211. **Moss.**

Botanical Geography for Schools. By C. E. Moss, B.SC. *With Illustrations.*

The writer does good service in calling attention to the value for educational purposes of a study hitherto almost entirely neglected in schools.

Geographical Terms. **Knox.**

Glossary of Geographical and Topographical Terms and of words of frequent occurrence in the composition of such terms and of place-names. By A. Knox. (Stanford's 'Compendium of Geography and Travel' (Supplementary volume).) London: E. Stanford, 1904. Size 8 × 5½, pp. xl. and 432. *Price 15s. Presented by the Publisher.* [To be reviewed.]

Geography. **Dryer.**

What is Geography? C. R. Dryer. From the *Teacher's Journal*, Marion, Indiana, [1903]. Size 9½ × 6½, pp. 14.

This is referred to at p. 421, *ante.*

Japanese Grammar. **Weintz.**

Japanese Grammar Self-taught. (In Roman Character.) With Phrases and Idioms. By H. J. Weintz. London: E. Marlborough & Co., 1904. Size 7½ × 5, pp. 184. *Price 5s. Presented by the Publishers.*

Lemuria. **Scott-Elliot.**

The Lost Lemuria. With two maps showing distribution of land areas at different periods. By W. Scott-Elliot. London: Theosophical Publishing Society, 1904. Size 9½ × 6, pp. 44. *Price 2s. 6d. net. Presented by the Publishers.*

An extraordinary jumble of Theosophical jargon with scientific facts borrowed from recognized authorities.

Library Catalogue.

Catalogue of the Books, Manuscripts, Maps, and Drawings in the British Museum (Natural History). 2 vols. (A–K). London: Longmans & Co., 1903–1904. Size 11½ × 9, pp. viii. and 1038. *Presented by the Trustees of the British Museum.*

When complete, this will be a valuable aid to bibliography, and is of interest to the

geographer, from the large number of works bearing on his science which it includes. It gives, under one alphabet, both names of authors and publications of learned societies, etc., but "separates" from these are only entered in the case of monographs of special importance. The stringency of this rule might perhaps have, with advantage, been more often relaxed. Thus we should have expected to find the valuable monographs forming Engler and Drude's 'Vegetation der Erde' separately catalogued, but this is not the case.

Travel. **Boehm.**

The Persian Gulf and South Sea Isles. By Sir E. C. Boehm, Bart. London: H. Cox, 1904. Size 9 × 5½, pp. xii. and 180. *Illustrations. Price* 6*s*. *Presented by the Publisher.*

Travel. **Thomson.**

Round the World, including Appendices. By J. P. Thomson, LL.D. Brisbane: the Outridge Printing Co., 1904. Size 10 × 6½, pp. xxviii. and 358. *Map and Illustrations. Presented by the Author.*

The tour included visits to the United States, Canada, Great Britain, the Rhine, France, and the Suez Canal. The appendices consist of reprints of papers on the Physical Geography of Australia and on Queensland.

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

EUROPE.

Baden. **Konigl. Preuss. Landes-Aufnahme.**

Uebersichtskarte von Baden. Scale 1 : 200,000 or 3·2 stat. miles to an inch. Bearbeitet in der Kartogr. Abteilung der Königl. Preuss. Landes-Aufnahme 1903–4. 6 sheets. *Price* 1.50*m. each sheet.*

Belgium. **Institut Cartographique Militaire.**

Carte des chemins de fer, routes et voies navigables de la Belgique. Scale 1 : 320,000 or 5 stat. miles to an inch. Publiée par l'Institut Cartographique Militaire, 1904.

Shows principal roads, railways, canals, etc., up to date. The map is also ruled into squares indicating the limits of the sheets on the large-scale 1 : 20,000 Government map of Belgium. It is printed in colours.

England and Wales. **Ordnance Survey.**

ORDNANCE SURVEY OF ENGLAND AND WALES:—Sheets published by the Director-General of the Ordnance Survey, Southampton, from October 1 to 31, 1904.

2 miles to 1 inch:—

With hills, and printed in colours, 51, 52, 1*s. each*; folded in cover or flat in sheets.

1-inch:—

(Third edition) in outline, 12, 15, 236, 256; 1*s. each*. (Engraved.)
(Third edition) printed in colours, 284, 285, 1*s. each*.
(Third edition) district-map, printed in colours, mounted on linen, 2*s*.; folded in cover or flat in sheets (Aldershot).

6-inch—County Maps (first revision):—

Leicestershire, 2 S.E., 7 N.E., S.E., 12 N.E., 13 N.E., S.E., 14 N.W., 20 N.E., 21 N.W., 23 N.W., 24 N.E., 27 N.W., N.E., S.W., S.E., 32 N.E., S.E., 33 N.E., S.W., S.E., 34 N.W., 36 S.W., 39 N.W., 42 N.W., S.W., S.E., 43 N.E., S.E., 44 S.E., 45 N.E., S.W., S.E., 46 N.W., S.W., 47 N.W., 49 N.W., S.E., 50 N.E. **Lincolnshire,** 112 S.E., 121 N.E., 130 N.W. **Radnorshire,** 23 N.W. **Rutland,** 4 N.E., S.E., 8 N.E., S.E., 15 N.W. **Somersetshire,** 8 S.E., 36 S.E., 47 N.E., 48 S.W., S.E., 50 N.E., 51 S.W., 52 N.W., 54 N.E., 57 N.W., 59 N.E., 61 S.W., 62 S.W., S.E., 63 N.W., S.W., 71 N.E., 80 N.W. **Staffordshire,** 67 N.E., 68 S.W. **Suffolk,** 82 N.E., 83 N.W., S.W. **Warwickshire,** 6 N.W., 11 N.W., S.W., S.E., 15 N.E. **Worcestershire,** 2 S.W., 8 N.W., 10 S.W. **Yorkshire** (first revision of 1891 survey), 285 N.E., S.E. 1*s. each.*

25-inch—County Maps (first revision):—

Brecknockshire, XI. 11, 12, 15, 16; XV. 3, 8; XX. 12, 16; XXII. 15; XXVI. 4, 5, 6, 7, 8, 9, 10, 11, 12; XXVIII. 1, 2, 3, 4, 6, 7, 8, 11, 12, 15; XLI. 16; XLII. 13, 14;

XLV. 3, 7, 8, 16; XLVI. 9, 13; XLVII. 2, 3, 4, 6, 7, 8; XLVIII. 1; L. 2, 3, 4, (6 and 7); LI. 1. **Devonshire**, XIII. 2; XV. 1, 15; XIX. 8; XX. 1, 11; XXIII. 9; XXXII. 12; XXXIII. 8, 9; XXXIV. 4, 8, 12; XLVI. 2, 3, 7, 8, 12, 14; XLVII. 2, 5, 6, 9, 11, 14; LVII. 3, 8. **Herefordshire**, XIV. 3, 4; XXXVII. 4, 7, 8, 11, 12, 15, 16; XXXVIII. 1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16; XLIII. 3, 8, 12, 15, 16. **Lincolnshire**, CXIII. 2, 3, 4, 6, 7, 8, 10, 12, 14, 15, 16; CXXXI. 1, 2, 3, 4, 7; CXXXII. 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16; CXXXIII. 1, 5, 6, 9, 10, 12, 13, 14; CXL. 3; CXLIII. 2, 3, 5, 6, 7, 9, 11; CXLIV. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 (15 and 16); CXLIVA. 1, 2, 5; CXLIX. 3, 7, 15; CXLIXA. 1; CLIII. 1, 2, 3, 4, 5, 6; CLIV. 1, 2, 3, 5, 6, 9, 10. **Norfolk**, CIX. 6. **Somersetshire**, VI. 2. **Suffolk**, XX. 7, 8; XXI. 5, 6, 7, 9, 10, 11, 13, 14; XXII. 5, 8, 12, 13, 16; XXIII. 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16; XXIV. 5, 6, 7, 9, 11, 13, 14, 15; XXV. 13, 14, 16; XXVI. 9, 10; XXXII. 1, 2; XXXIII. 3; XXXIV. 1, 2, 3, 4; XXXV. 1, 2, 3, 4; XXXVI. 1, 2, 3, 4; XXXVII. 1, 2, 3, 4, 8; XXXVIII. 10; XXXIX. 6, 13, 14; XLIX. 3; L. 4. **Warwickshire**, XVII. 13, 14; XVIII. 14; XIX. 3, 7, 8, 16; XX. 13, 15, 16; XLIX. 6, 7, 10. **Worcestershire**, XI. 1, 3, 5, 7; XVI. 16; XXIII. 4; XXVI. 3, 4; XXVII. 1; XL. 13, 14, 15, 16; XLI. 13, 14, 15; XLII. 3, 8, 10, 11, 12; XLIII. 6, 9, 10; XLVII. 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16; XLVIII. 1, 2, 3, 5, 6, 7; LIV. 3, 4, 7. *3s. each.*

United Kingdom. **Geological Survey.**

Summary of Progress for 1903. 1*s.*

(*E. Stanford, London Agent.*)

Germany. **Königl. Preuss. Landes-Aufnahme.**

Karte des Deutschen Reiches. Scale 1:100,000 or 1·6 stat. mile to an inch. Sheet 239, Salzwedel. Herausgegeben von der Kartogr. Abteilung der Königl. Preussische Landes-Aufnahme, 1904. *Price* 1.50*m. each sheet.*

Great Britain. **Woodward.**

Stanford's Geological Atlas of Great Britain, with plates of characteristic fossils. Preceded by a Description of the Geological Structure of Great Britain and its counties; and of the features observable along the principal lines of railway. By Horace B. Woodward, F.R.S., F.G.S. London: Edward Stanford, 1904. *Price* 12*s.* 6*d. net. Presented by the Publisher.*

It is now forty-four years since the first edition of Reynold's Geological Atlas, prepared with the assistance of Prof. John Morris, was published; and although the work was revised by Mr. Robert Etheridge in 1889, and a revised edition issued, the Geological Survey and other geological investigations have made considerable progress since that date. Mr. Stanford has now brought out a geological atlas of Great Britain, based upon and following much the same lines as the previous useful work, and the fact that the preparation of it has been entrusted to Mr. Horace B. Woodward is sufficient guarantee of its thoroughness and general merit. The maps of the original atlas were based to a large extent on those of the Geological Survey, and they have been revised as far as the scale has permitted, from later maps of the same survey, and from Sir Archibald Geikie's Geological Map of Scotland. The text has been entirely re-written; fuller descriptions of the geological formations and lists of localities for fossils have been given. Whilst a few of the original text-illustrations have been retained, most of these are fresh, many being taken from other authorities, which are fully acknowledged.

Ireland. **Bartholomew.**

Bartholomew's "Quarter-inch to Mile" Map of Ireland. Reduced by permission from the Ordnance Survey. Sheet 6. Dublin and Athlone. Edinburgh: John Bartholomew & Co., [1904]. *Price* 2*s., mounted on cloth. Presented by the Publisher.*

Netherlands. **Beekman and Schuiling.**

Schoolatlas van Nederland en zijne Overzeesche Bezittingen. Door A. A. Beekman en R. Schuiling. Vierde Druk. Zutphen: W. J. Thieme & Cie. *Price* 2.90*f.*

This is a very good general atlas of the Netherlands and the Dutch colonial possessions, and its usefulness will doubtless extend beyond the schoolroom. A special feature is the clear manner in which the character of the land is indicated by colouring, in addition to which a considerable amount of information is given by various colours and symbols concerning dykes, canals, etc.

Oder. **Königl. Oderstrombauverwaltung, Breslau.**

Uebersichtskarte von dem Niederschlagsgebeit der Oder mit Darstellung der mittleren jährlichen Niederschlagshöhen aus den neuesten veröffentlichten Beobachtungen des hydrologischen Jahrzehnts. Scale 1: 600,000 or 9·4 stat. miles to an

inch. Bearbeitet in der Königlichen Oderstrombauverwaltung in Breslau. Glogau: Carl Flemming, 1904.

The mean annual rainfall of the Oder basin is shown on this map by the usual blue tinting, of varying intensity, based upon observations taken at numerous stations, which are indicated, during a period of ten years from November 1, 1890, to October 31, 1900. Brown contours and small figures, showing at a glance the approximate height of land of any locality, are also given, and these are important in connection with the rainfall of any special district. The map has been carefully prepared, and will be of considerable service in connection with other material dealing with the rainfall of this part of Europe.

ASIA.

Arabia. **Bartholomew.**

Two maps showing the Orographical and Land Surface Features of Arabia. By J. G. Bartholomew, F.R.G.S. Scale 1: 10,000,000 or 157·8 stat. miles to an inch. Edinburgh: John Bartholomew & Co., [1904]. *Presented by the Publisher.*

Asia Minor. **Kiepert.**

Karte von Kleinasien. Von Dr. Richard Kiepert. Scale 1: 400,000 or 6·3 stat. miles to an inch. Sheets: D I. Budrum; B VI. Erzirum; C VI. Diarbekr. Berlin: Dietrich Reimer (Ernst Vohsen), 1904. *Price* 6*m.*

With the publication of the present part fifteen sheets of this map, out of a total of twenty-four, have appeared. It is evident, from an inspection of these important sheets, that Dr. Kiepert spares no pains to render his map as complete as possible, although much of the available information from which it has been compiled can only be of a very approximate character.

China. **Königl. Preuss. Landes-Aufnahme.**

Karte von Ost-China. Scale 1: 1,000,000 or 15·8 stat. miles to an inch. Sheet: Sairussu. Kartographische Abtheilungen der Königl. Preussische Landes-Aufnahme, 1904. *Price* 1·50*m. each sheet.*

Dutch East Indies. **Stemfoort and Siethoff.**

Atlas der Nederlandsche Bezittingen in Oost-Indië, naar de nieuwste Bronnen samengesteld en aan de regeering opgedragen door J. W. Stemfoort en J. J. ten Siethoff, Kapiteins van den Generalen staf van het Nederlandsch-Indisch leger. Gereproduceerd, op last van het Departement van Koloniën, aan de Topographische inrichting te 'sGravenhage, onder leiding van den Directeur C. A. Eckstein. New edition. Sheets: 6, Noord Sumatra; scale 1: 900,000 or 14·2 stat. miles to an inch, 1904. 9, Sumatra's Westkust; scale 1: 600,000 or 9·5 stat. miles to an inch, 1903.

Persia. **Stahl.**

Geologische Karte von Karadag (Persien). Nach den Karten der Gesellschaft Goriainoff und Enakieff und den geologischen Aufnahmen der Bergingenieure Kurmakoff und Iwanoff bearbeitet von A. F. Stahl, 1904. *Petermanns Geographische Mitteilungen*, Jahrgang 1904, Taf. 17. Gotha: Justus Perthes, 1904. *Presented by the Publisher.*

AFRICA.

Africa. **Intelligence Division, War Office**

Africa. Scale 1: 1,000,000 or 15·8 stat. miles to an inch. Sheet 82, Fernando Po. *Price* 2*s.* Egyptian Sudan. Scale 1: 250,000 or 3·9 stat. miles to an inch. Sheets: 46-J, Karora; 55-E, Kagmar; 55-H, Gedaref; 55-I, El Obeid; 55-K, Sennar; 55-L, Doka; 55-O, Karkoj; 56-A, Kassala; 56-I, Nogara. *Price* 1*s.* 6*d. each sheet.* Anglo-Egyptian Sudan. Compiled in the Intelligence Office, Khartum. May, 1904. Scale 1: 4,000,000 or 63·1 stat. miles to an inch. (Index to the sheets of the 1: 250,000 Series.) *Price* 1*s.* 6*d.* London: Intelligence Division, War Office, 1904.

Egypt. **Survey Department, Cairo.**

Provisional Map of Quena Province. Scale 1: 50,000 or 1·3 inch to a mile. 6 Sheets. Map of Lower Egypt and the Fayum. Scale 1: 50,000 or 1·3 inch to a mile. Cairo: Public Works Ministry, Survey Department, 1904. *Presented by the Director-General, Survey Department, Cairo.*

German East Africa. **Sprigade.**

Karte der Gebiete am südlichen Tanganjika- und Rukwa-See. Hauptsachlich nach den Aufnahmen des Hauptmann v. Prittwitz u. Gaffron und mit Benutzung unveröffentlicher Aufnahmen, sowie aller andtren veröffentlichten Materialien, bearbeitet von P. Sprigade, gezeichnet von H. Nobiling. Scale 1 : 500,000 or 7·9 stat. miles to an inch. From the *Mitteilungen aus den deutschen Schutzgebieten*, Band xvii., 1904.

Includes that part of German East Africa lying between latitude 6° and 8° 50′ S. and longitude 30° to 34° E. In its compilation the route surveys of many German officials and others have been utilized, and the map is certainly the most complete that has hitherto been published of this special region. It is well executed and printed in colours.

St. Helena. **Intelligence Division, War Office.**

St. Helena. Scale 1 : 25,000 or 2·5 inches to one stat. mile. London: Intelligence Division, War Office, 1904. *Price 3s. Presented by the Intelligence Division, War Office.*

A very effective map of the island printed in four colours. Relief is shown by contour lines, at 100-feet intervals, and brown shading.

Togo. **Seefried.**

Aufnahme des Haho von Oberleutnant Freiherr von Seefried. Nach einer Originalconstruction des Oberleutnant Freiherr von Seefried im Massstabe 1 : 12,500 reduziert auf 1 : 100,000 durch den Geometer Arendt. From the *Deutsches Kolonialblatt*, 1904, No. 16.

The Haho is a small river in the German territory of Togo. This is a sketch-map merely showing the course of the river, with notes as to its breadth, amount of water, etc.

West Africa. **Sprigade.**

Karte der deutsche-englischen Grenze im Tschokossi-Mamprussi-Gebiet. Nach den Aufnahmen der deutschen Grenzkommissions-Mitglieder Graf Zech und Frhr. v. Seefried, 1902, bearbeitet von P. Sprigade. Scale 1 : 100,000 or 1·6 stat. miles to an inch. (From the *Mitteilungen aus den deutschen Schutzgebieten*, Band xvii., 1904.) *Presented by the Author.*

Shows the Anglo-German boundary-line between northern Togo and the northern territories of the Gold Coast, from recent surveys of the German Boundary Commissioners.

Zanzibar. **Zanzibar Government.**

A map of Zanzibar Island from surveys made by Imam Sherif Khan Bahadur, Survey of India, under the direction of the late General Sir Lloyd William Mathews, K.C.M.G. Scale 1 : 31,680 or 2 inches to a stat. mile. 10 Sheets. London: Edward Stanford, 1904. *Price 21s. Presented by Basil Cave, Esq., C.B.*

The survey of the island of Zanzibar, which forms the basis of this map, has been conducted by the well-known native Indian surveyor, Imam Sherif Khan Bahadur, who, after considerable experience on the Indian Government Survey, has in recent years done excellent work in other parts of Asia in connection with various exploring expeditions to which he has been attached. He is especially expert at plane-tabling, and his maps of parts of Arabia, made during the late Mr. Theodore Bent's expeditions, are well known. In 1896 he was granted one of the minor awards of the Royal Geographical Society for his excellent work. His surveys of Zanzibar, the results of which are embodied upon these two maps, constitute the first attempt at anything like a regular survey of the interior of the island on a large scale, and, although incomplete, it is decidedly a creditable piece of work. The map has been published on two scales, under the direction of the late General Sir Lloyd William Mathews, K.C.M.G., who held the office of prime minister to the Sultan.

AMERICA.

Canada. **Surveyor-General of Canada.**

Sectional Map of Canada. Scale 1 : 190,080 or 3 stat. miles to an inch. Fort Pitt sheet (63), West of Third Meridian, revised to September 2, 1904; Victoria sheet (80), West of Fourth Meridian, revised to September 2, 1904. Ottawa: Surveyor-General's Office, 1904. *Presented by the Surveyor-General of Canada.*

St. Lawrence Basin. **Bartholomew.**

Orographical map of the St. Lawrence Basin. By J. G. Bartholomew, F.R.G.S. Scale 1 : 5,000,000 or 78·9 stat. miles to an inch. Edinburgh: John Bartholomew & Co., [1904]. *Presented by the Publisher.*

In many parts the information from which this orographically coloured map has been

prepared is necessarily extremely vague and approximate, especially in the northern regions. The actual area included is far greater than the St. Lawrence basin, which is clearly indicated by a red line.

GENERAL.

World. **Hartleben.**

A. Hartleben's Volks-Atlas enthaltend 72 Karten in Einhundert Kartenseiten. Vierte-Auflage. Lieferung 17. Vienna and Leipzig: A. Hartleben, [1904]. *Price 50 pf. each part.*

This part contains the following maps: Sheet 3 of a map of Germany on the scale of 1: 1,350,000; map of North-West Africa on the scale of 1: 12,000,000; map of the United States on the scale of 1: 10,000,000.

World. **Petrie and Schokalsky.**

Marcks' Large General Table Atlas. Edited by Prof. E. J. Petrie and Colonel J. de Schokalsky. Part 9. St. Petersburg: A. F. Marcks, 1904. [In Russian.] *Presented by the Publisher.*

This part contains plates: 12, Ethnographic and linguistic map of Europe, scale 1: 12,000,000; 33, West and Central Germany, scale 1: 1,000,000; 36, Western Alps, scale 1: 1,000,000; 49, Palestine, scale 1: 700,000.

World. **Rinaudo.**

Atlante Storico per le Scuole Secondarie del Prof. Costanzo Rinaudo. Parte Terza: I Tempi Moderni, 28, Carte e Repertorio di tutti i nomi. Disegni del Cav. Domenico Locchi. Turin: G. B. Paravia, 1904. *Presented by the Publisher.*

The third part of this Prof. Costanzo Rinaudo's historical atlas for secondary schools includes the period from about the middle of the sixteenth century to the present time. There are altogether twenty-eight maps, twenty-four of which are devoted to Europe; one, on a small scale, to the Italian possession on the African Red Sea coast; one to the United States; and two of the whole world, showing European colonial possessions in 1789 and 1904. A complete index to place-names is given, as well as several pages of explanatory letterpress.

World. **Stieler.**

Neue, neunte Lieferungs—Ausgabe von Stielers Hand-Atlas. 100 Karten in Kupferstich. 35 and 36, Lieferung. Gotha: Justus Perthes. *Price 60 pf. each part.*

These two parts are in one cover, and contain the following maps: No. 8, German Empire. Scale 1: 3,700,000; No. 43, Russia and Scandinavia. Scale 1: 10,000,000; Nos. 51 and 52, sheets 1 and 2 of a map of the Balkan Peninsula on the scale of 1: 1,500,000.

CHARTS.

Chile. **Chilian Hydrographic Office.**

Estrecho de Magallanes. No. 96, Puerto Zenteno, Canal Tortudso i Laguna Baja. No. 97, Canal i Puerto Condor i Lago de la Botella. Scale 1: 20,000 or 3·2 inches to 1 stat. mile. Valparaiso: Oficina Hidrografica, Chile, 1903. *Presented by the Chilian Hydrographic Office.*

North Atlantic and Mediterranean. **Meteorological Office.**

Pilot Chart of the North Atlantic and Mediterranean for November, 1904. London: Meteorological Office, 1904. *Price 6d. Presented by the Meteorological Office, London.*

United States Charts. **United States Hydrographic Office.**

Pilot Charts of the North Atlantic Ocean and of the North Pacific Ocean for November, 1904. Washington: U.S. Hydrographic Office, 1904. *Presented by the U.S. Hydrographic Office.*

N.B.—It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

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Colonsay
Firth of Forth
St Andrews
Inishtrahull
Lough Foyle
Lough Neagh
Belfast Lough
Allen Craig
Luce Bay
Solway Firth
Workington
St Bees Hd
Pt of Ayr
Isle of Man
Ramsey
Peel
Douglas
Walney
Morecambe Bay
Fleetwood
Shell Flat
Blackpool
Ribble
Southport
Formby Pt
Liverpool Bay
Liverpool
Dee
Carlingford L
Dundalk Bay
Dunany Pt
Drogheda
Howth Hd
Dublin Bay
Wicklow Hd
Arklow
Caernarvon Bay
Tremadoc Bay
Cardigan
Wexford
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Outer Silver Pit
Sole Pit
Coal Pit
Outer Dowsing
Inner Dowsing
Docking Shoal
Race Bank
Black Bank
Burham Flats
The Wash
Spurn Hd
Sand Hale Flat
Bridlington Bay
Flamborough Hd
Robin Hood Bay
Scarborough
Tees Mouth
Berwick
Humber
Holderness
Lincolnshire
Norfolk
Yarmouth
Cromer
Hasborough Sand
Middle Cross Sand
Canvey Island
Chargrove Forest

The Edinburgh Geographical Institute

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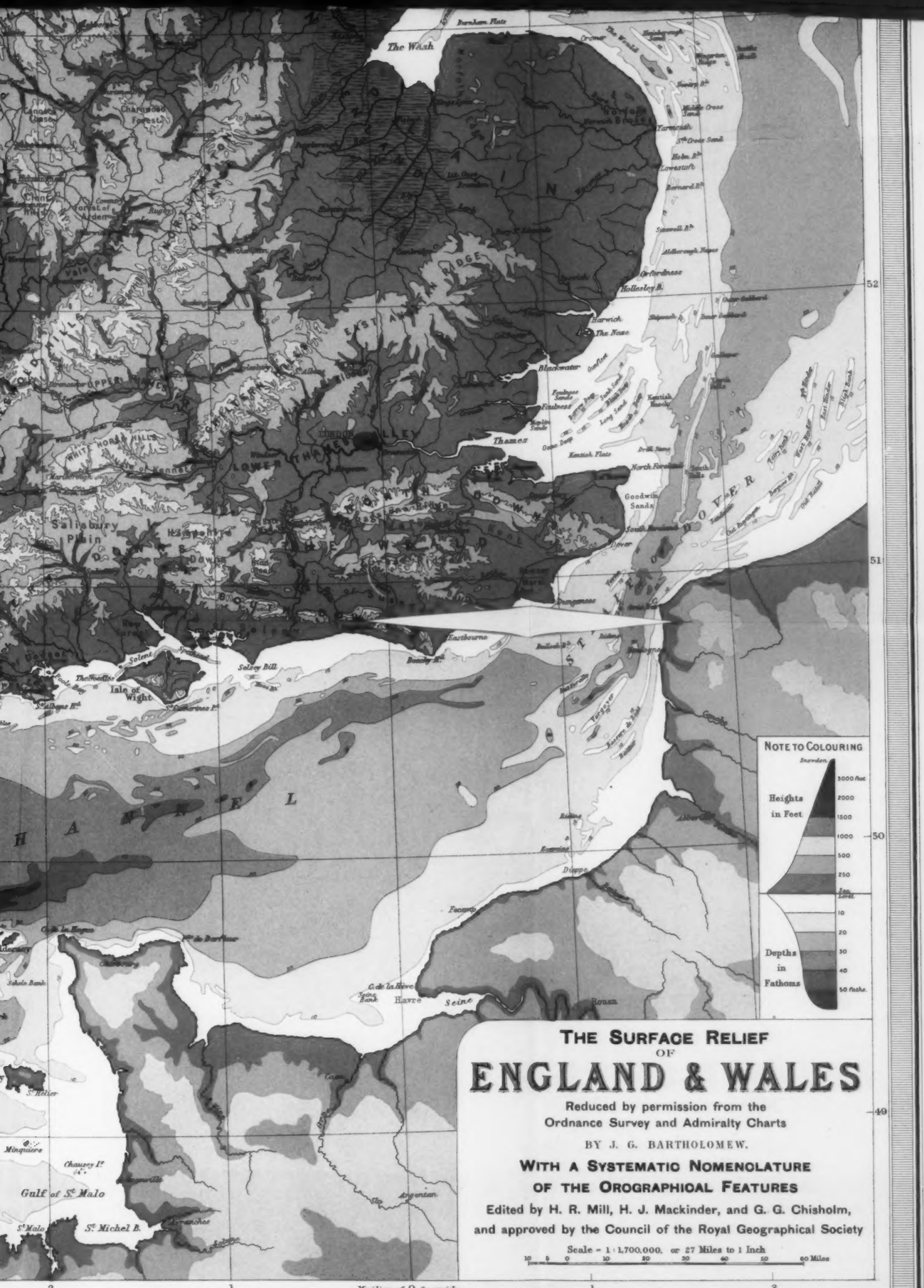
The Wash
Burnham Flats
Chiltern Hills
Chalkwood Forest
Forest of Arden
Vale of Evesham
Vale of Gloucester
Vale of Berkeley
Cotswold Hills
Malvern Hills
Black Mountains
Brecon Beacons
Forest of Dean
Severn
Bristol Channel
Exmoor
Quantock Hills
Mendip Hills
Blackdown Hills
Dartmoor
Bodmin Moor
Land's End
Lizard Point
Scilly Isles
Salisbury Plain
Marlborough Downs
Hampshire Downs
Dorset Downs
Isle of Wight
The Needles
Solent
Spithead
Selsey Bill
Beachy Head
Eastbourne
Dungeness
Romney Marsh
Goodwin Sands
South Foreland
Dover
Strait of Dover
North Foreland
Kentish Flats
Drill Stone
Thames
Lower Thames Valley
Upper Thames Valley
Hounslow Heath
Windsor Forest
Basingstoke Canal
Aldershot
Farnham
Guildford
Dorking
Reigate
Tunbridge Wells
Ashdown Forest
Hastings
Rye
Winchelsea
Pevensey Bay
Pevensey Levels
Hollesley B.
Harwich
The Naze
Blackwater
Foulness
Foulness Sands
Barrow Deep
Ower Deep
Kentish Knock
Long Sand
Knock John Sand
Tongue Sand
Sunk Sand
Middle Sand
Inner Gabbard
Outer Gabbard
Galloper
Kentish Knock
Yarmouth
Middle Cross Sand
5th Cross Sand
Holm Bk
Lowestoft
Barnard Bk
Sizewell Bk
Aldeburgh Haven
Orfordness
Shipwash
Newcastle
Durham
Yorkshire
Lincolnshire
Norfolk
East Anglia
Ridge
Wash
Ouse
Trent
Humber
Wash Deep
Middle Ground
Knock Deep
Outer Deep
Inner Deep
Gunfleet
Tongue
Tongue Sand
Kentish Flats
Drill Stone
North Foreland
South Sands
Goodwin Sands
Deal
Ramsgate
Margate
Herne Bay
Whitstable
Sheerness
Chatham
Rochester
Gravesend
Tilbury
Southend
Foulness
Burnham
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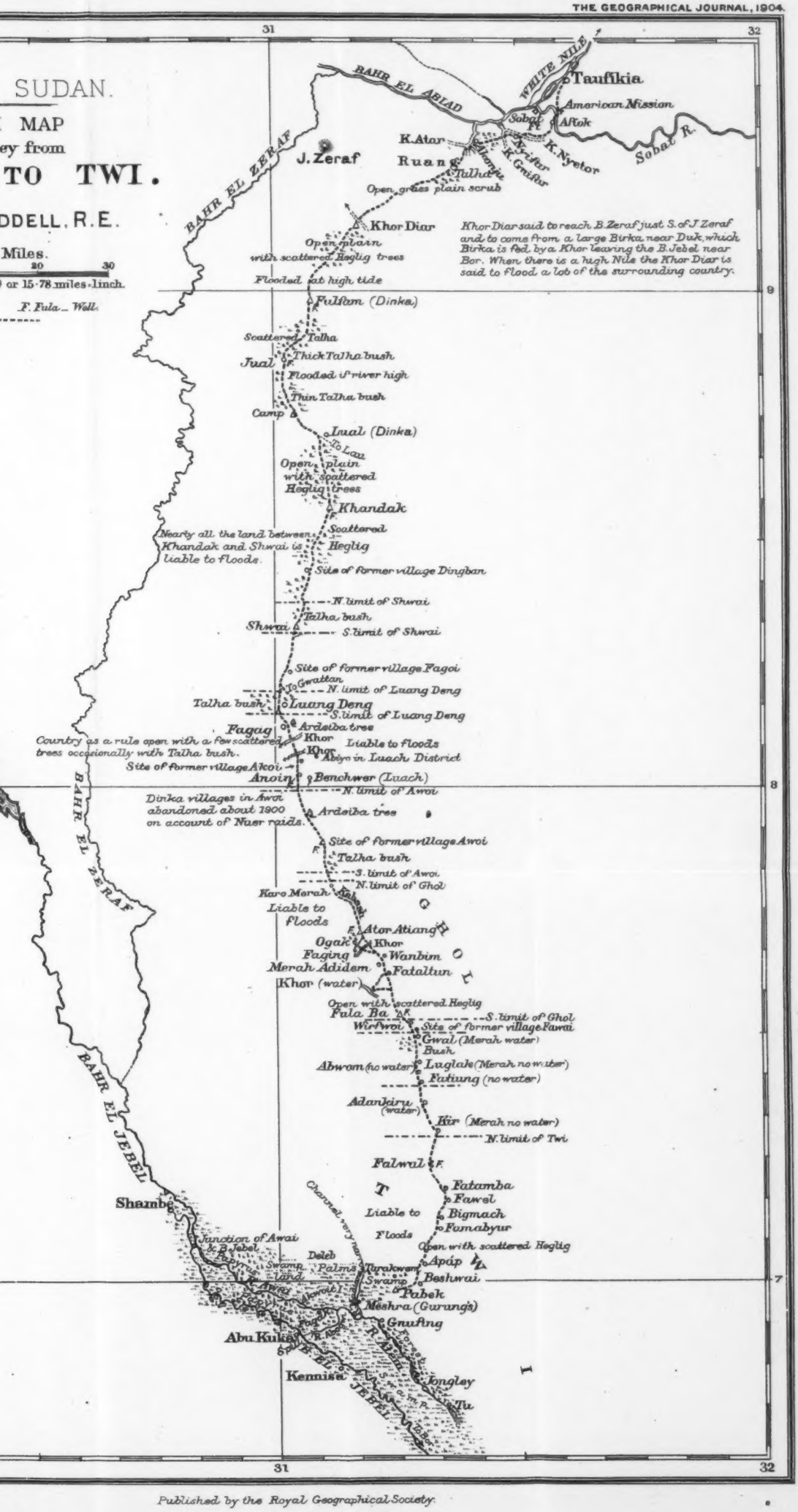

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